

MUNICIPAL COUNCIL 1985
**METROPOLITAN TORONTO
WATER POLLUTION COMMITTEE**



REPORT 1985



OCTOBER 1985

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**METROPOLITAN TORONTO
WATER POLLUTION COMMITTEE**

OCTOBER 1985

**METROPOLITAN TORONTO WATER POLLUTION COMMITTEE
COMMITTEE MEMBERSHIP**

1983/1984

Alderman Tony O'Donohue (Toronto), Chairman
Alderman Fred Beavis (Toronto)
Alderman Florence Cruickshank (Scarborough)
Mayor C. Dennis Flynn (Etobicoke)
Alderman Chris Stockwell (Etobicoke) - Alternate
Alderman Tom Jakobek (Toronto)
Alderman Derwyn Shea (Toronto)
Metropolitan Chairman (Ex-officio)
Committee Coordinator, Bryn Lloyd

1984/1985

Mayor Bruce Sinclair (Etobicoke), replaced Mayor Flynn
Controller Ed Fulton (Scarborough), replaced Alderman Cruickshank
Controller Bill Belfontaine (Scarborough), replaced
Controller Ed Fulton
Alderman Mario Gentile (North York), Chairman of Metropolitan
Toronto Works Committee, was appointed to the Committee



Tony O'Donohue, P.Eng.

Executive Alderman

Ward 4

City Hall, Toronto M5H 2N2

Tel: 947-7012



October 8, 1985

TO: THE CHAIRMAN AND MEMBERS OF THE METRO EXECUTIVE COMMITTEE

Further to the report of the Metropolitan Toronto Water Pollution Committee, 1985, and my letter dated October 7 which appears as item 112 (a) on the supplementary agenda, I set out herewith the recommendations of the Committee which are embodied in the report:

- (1) Evaluate a programme to separate roof storm drainage to reduce combined sewer overflow discharge directly to watercourses and its impact on Lake Ontario waterfront discharge to the sewer system and the sewage treatment process.
- (2) Continue to reduce geese and gull population across the waterfront and their fecal pollutant contribution from this source via the storm sewer system and directly to the waterfront beaches and breakwaters.
- (3) Review the existing recreational water quality guidelines of the Provincial Ministry of the Environment, currently applied by the Medical Officers of Health considering alternative indicators other than fecal coliform, such as virus, sampling locations and procedures and the real health impact of adopting the Canadian or United States Federal or other guidelines possibly with a new epidemiological study.
- (4) Examine the practicality of providing new self contained swimming areas, pools or lakes, to permit better control of water quality and temperatures to complement the Lake Ontario waterfront.
- (5) Continue the efforts put in place and accelerated by the various municipalities, agencies, TAWMS, Water Pollution Committee and the Provincial Ministry of the Environment to improve waterfront water quality.
- (6) Continue accelerated sewer separation for at least two more years. Continue the sewer separation subsidy increase from 20 to 25 per cent and 40 to 50 per cent (depending on the design criteria for the eligible storm sewers).

....2

- (7) The Water Pollution Committee should continue to work to develop its program and effect coordination between abutting Regions, sharing watersheds with Conservation Authorities to facilitate cooperation and action to improve water quality in watercourses and the Lake Ontario shore line which serve more than our Region and Authority.
- (8) The Water Pollution Committee should continue to pursue the Government of Canada to re-establish the Federal Grant Programme recently discontinued, to assist municipalities to meet Lake Ontario water quality objectives, which have in part been established by Federal participation in the International Joint Commission.
- (9) Establish long term and accelerated short term programme of assured Provincial and Federal contributions to complement municipal share of cost for capital works improvements to water pollution control projects.

Sincerely,

A handwritten signature in cursive script, reading "Tony O'Donohue", followed by a horizontal line.

Tony O'Donohue, P.Eng.
Chairman - Metropolitan Toronto
Water Pollution Committee

SECTION 1.0

TABLE OF CONTENTS

1.0 **TABLE OF CONTENTS**

1.0 Table of Contents

2.0 Introduction

3.0 Factors affecting Waterfront Water Quality

3.1 Storm and Combined sewer overflows

3.2 Non point sources

3.2.1 Animal and bird feces

3.2.2 Storm water runoff

3.3 Nearshore circulation patterns

3.3.1 Western Beaches

3.3.2 Eastern Beaches

3.4 Sewage treatment improvements

3.4.1 Main Treatment Plant Outfall Study

3.4.2 Humber Treatment Plant Outfall Study

3.5 Recreational Water Quality Objectives - Provincial Guidelines
applied by the Local Medical Officers of Health.

4.0 1984 Waterfront Water Quality Improvement Programme

Appendix "A" - Water Pollution Committee Report adopted by Metropolitan Council on March 27, 1984

Appendix "B" - Agreement with Province of Ontario dated March 28, 1984

Table 2 - Summary of Action and Expenditures

5.0 1985 Waterfront Water Quality Improvement Programme -

Appendix "C" - Projected Expenditures by Metropolitan Toronto 1986-1990

Appendix "D" - Water Pollution Committee Report adopted by Metropolitan Council on May 14, 1985

Appendix "E" - Agreement with the Province of Ontario dated June 5, 1985

Table 3 - Sewer Separation Funding Sources for 1985

Table 4 - Projection of Sewer Separation Expenditure by local municipalities for 1986-1990

6.0 Discussion of Recommendations.

6.1 Water Quality Objectives and Standards

6.2 Combined Sewer System

- 6.3 Western Beaches
- 6.4 Island Beaches
- 6.5 Eastern Beaches
- 6.6 Sewage Treatment Improvements - Funding
- 6.7 Phosphorus Removal
- 6.8 Effluent Chlorination
- 6.9 Animal and bird Feces Control
- 6.10 Storm Water Quality and Control
- 7.0 Executive Summary by Waterfront Area.
 - 7.1 Factors affecting the Waterfront Water Quality
 - 7.2 Summary of Action taken and Recommendations
- 8.0 Summary of Appendices
 - 8.1 Summary of Tables
 - 8.2 Summary of Figures

SECTION 2.0
INTRODUCTION

2.0 INTRODUCTION

During 1983 the application of the Provincial Recreational water quality guideline of 100 fecal coliform per 100 millilitres of water and a change in the procedure for taking samples resulted in an apparent greater frequency in the posting of warnings at Beaches by the City of Toronto, Medical Officer of Health. The warnings read as follows:

WARNING

Polluted Waters

Persons Bathing

Do So At Their Own Risk

This focussed increased attention on waterfront water quality which led to the formation of the Water Pollution Committee.

The Committee was established as authorized by the Metropolitan Executive Committee with the objective of co-ordinating activities to improve water quality and the Provincial and Federal Contributions that may be, or become, available in future. It should be noted that the Eastern and Western Beaches, the largest and most used beach areas, lie within the City of Toronto and the jurisdiction for their maintenance and any physical improvements lies primarily with the City.

Following two years of activities, it can be concluded that the local Medical Officers of Health have adopted Provincial Ministry of Environment Guideline standards for recreational water quality, which are as high or higher than any other urban area that we know off. Accordingly, some difficulty can be expected in meeting them, having regard for the obvious environmental impact of sanitary waste and urban storm runoff from the 2.1 million people and 240 square miles surface of Metropolitan Toronto.

While our existing systems for controlling pollution are as good as any others, we can do better. It is perceived that the objectives of the citizens and local municipalities of Metropolitan Toronto warrant dedication of increased priority and expenditures to permit achievement of the highest practical standards of water quality and reduced frequency of posting of warnings on our local beaches.

The Committee, local municipalities and Metropolitan Toronto and Region Conservation Authority have identified some of the areas where improvement can be made in the future and have initiated certain studies that will provide information that will lead to identification of further action. However, these studies will require substantial expenditure of money, the appropriation of which will require evaluation of costs with respect to benefits, the priorities with respect to other necessary public services, and the affordability of the cost and its tax levy impact. In order to make the evaluations and decisions with respect to which work should proceed and at what time, it is necessary to understand the existing conditions and the sources of pollutants, alternative courses of action, and the estimated benefits. The following report endeavours to lay out a course of action and offer some alternatives which will require further consideration and in some cases an analysis of benefits and costs to determine if they are cost effective.

SECTION 3.0

FACTORS AFFECTING WATERFRONT WATER QUALITY

3.0 FACTORS AFFECTING WATERFRONT WATER QUALITY

As a result in part of investigations initiated by the Water Pollution Committee and from physical work in progress or completed at the time of the Committee's formation, several reasons for the incidence of levels of fecal coliforms at the shoreline in excess of the current standard have been identified and documented. The reasons include both point and non-point actual sources of pollutants and conditions such as current and lack of circulation, which inhibit the natural process for disposal and attenuation of pollutants. The more significant of these contributing factors are discussed below.

3.1 Storm and Combined Sewer Overflows

There are, within the City of Toronto alone, approximately 133 storm and combined sewer overflow of which 47 discharge directly to Lake Ontario with the remainder (86) discharging to natural watercourses which ultimately outlet to the Lake (Refer to Figure 5). There are several hundred more outfalls located in the remaining area municipalities discharging to the rivers and to Lake Ontario. (Refer to TAWMS Report on Humber and Don Watersheds).

Combined waste-water collection systems have only a one-pipe network to collect domestic waste water, industrial wastes and storm runoff water. The dry weather flow (domestic and industrial waste water, plus street drainage from washing operations and lawn sprinkling) is intercepted for treatment. However, during storms when the combined sanitary waste water and runoff may exceed the dry weather flow by a factor of 10 or 20, and therefore exceed the capacity of the treatment plant and collection system, the overflow is by-passed directly to a receiving watercourse without treatment resulting in pollution, health hazards, as well as flooding of streets and basements.

Because of the very high quantities of storm drainage in relation to sanitary drainage, municipalities do not have storm water treatment systems, although some have detention facilities for combined storm flow. These, however, have limited capacity and require regular displacement or removal of solids that settle out during detention.

Various solutions for the problem of overflows from combined sewer systems are now receiving attention in most large cities in the United States and Canada which are served, at least partially, by combined sewers. The most common solution, and that adopted by the local municipalities within Metropolitan Toronto has been to

separate the system by constructing new storm sewers to carry ground surface drainage leaving the combined sewers for sanitary and roof drainage, and to prohibit the further installation of new combined sewers or systems except under extenuating circumstances. In such cases, the proponents are required to provide the justification for the continued use of combined sewers along with a plan and timetable for the ultimate disposition of the storm drainage.

It is estimated that the ground surface drainage captured by road catchbasin diversions, ditches, watercourses, rivers etc., amount to approximately 70 per cent. of the rainfall runoff. The remaining 30 per cent. is roof drainage, which often remains connected to sanitary drains within private property because of the inability of the municipality to force the property owner to undertake remedial work to comply with current requirements.

The separation of this remaining roof drainage will only occur as private property redevelops and the requirements for separation on private property apply. Some property owners on their own redirect roof drainage to the ground surface voluntarily to avoid basement flooding. Others redirect it from the ground to the sanitary system to keep their ground surface dry. This means the sanitary system is

receiving a load for which it is not designed. This additional storm flow must be treated thereafter and causes an unnecessarily high peak flow that exacerbates the basement flooding problems, increases combined sewer overflows, and reduces sewage treatment efficiency. In view of the fact that redevelopment of most private properties will take decades, a programme of incentives to remove storm flow from sanitary systems should be considered if this source of pollutants is to be reduced.

Some municipalities are now requiring discharge of roof storm water to the ground surface for new developments, in order to control the peaking of storm water flow, which makes storm water management so costly. Their incentive is usually to avoid flooding in the storm system rather than to improve sewage treatment efficiency and costs.

In this regard, the Ontario Ministry of the Environment Guidelines for Design of Sanitary and Storm sewers states that "all new sewer construction within the Province of Ontario should be of the separate type, with all forms of storm and groundwater flow being excluded to the greatest possible extent."

In spite of the existence of the above guidelines, a great number of supposedly separated storm outfalls have been found to carry

pollutants during both dry weather and rainfall events. Such outfalls may carry uncontaminated groundwater as well as illegal sanitary or industrial flow from unknown municipal and or industrial sources.

Programmes to identify cross connections between sanitary and storm systems, have been accelerated recently; however, storm sewer sampling indicates that in many cases some remain.

As part of the Toronto Area Watershed Management Strategy Study (TAWMS) a program of sewer outfall mapping and sampling was undertaken in the Mimico Creek and Humber River watersheds within Metropolitan Toronto and in the Don River watershed including areas within the Regional Municipality of York.

The study terminated with the identification of outfalls considered to be significant contributors of chemical and fecal bacterial contamination. Funding was provided under both the 1984 and 1985 Waterfront Water Quality Improvement Programmes to assist in funding the follow-up actions to locate the actual sources of contamination, which have been initiated by the respective area municipalities.

3.2 Non Point Sources

Non Point sources can be described as those which do not emanate from a specific identifiable point such as a pipe outlet. They include animal and bird feces, fertilizers and pesticides applied to the land, the products of operation and wear of vehicles all of which are washed from the ground surface and conveyed to the waterfront by the storm and combined sewers. Their impact will be discussed further below, under Storm Water Runoff.

3.2.1 Animal and Bird Feces

On June 15, 1983, Terms of Reference for a study entitled "Canada Goose/Gull Management Plan" and the retention of Dr. Peter Fetterolf was approved at a cost not to exceed \$8,100. The study was to be undertaken within a five month period from June 18, 1983, to November 19, 1983.

The study was divided into four parts:

- (1) history of gull and goose populations in Toronto and vicinity;
- (2) park user survey;

- (3) projections of future population numbers in Toronto and vicinity; and
- (4) options and recommendations for management of these gull and goose populations.

The study area encompassed parks of the Toronto waterfront as well as two island sites in the M.T.R.C.A.'s jurisdiction. Documentation of use of areas by birds and surveys of public opinion about these birds were conducted at the following public areas:

- (1) Black Creek Pioneer Village;
- (2) Marie Curtis Park;
- (3) Humber Bay Park;
- (4) Aquatic Park;
- (5) Ashbridges Bay Park;
- (6) Bluffers Park;
- (7) The Metropolitan Toronto Zoo;
- (8) Petticoat Creek conservation Area;

(9) Ajax Waterfront.

The report; contains the following 16 summary points related to the Gull/Goose situation in Toronto:

Gulls and Terns

- (1) Most gulls are probably attracted to public areas by the food provided to them by people. Some food is purchased at the site but most is brought by visitors.
- (2) Most gulls that were begging for food at public areas were juveniles (young of this year) that were probably raised on Aquatic Park or Mugg's Island in Toronto.
- (3) Large numbers of gulls, mainly adults, regularly used Aquatic Park, Humber Bay Park, Ashbridges Bay Park, and Bluffers Park as resting sites.
- (4) Opinion surveys at public areas which were studied indicated that most users (about 75%) felt the gulls should be left alone. Seventy-eight percent of those queried stated that gulls had improved or had no effect on their visit.



WESTERN BEACHES

Geese and fecal impact on grassed areas adjacent to shoreline



WESTERN BEACHES

Gulls and fecal impact on breakwater

- (5) Local parks offices in each city of Metropolitan Toronto and most other public agencies received few complaints about gulls from the general public.
- (6) At present, problems with gulls are highly localized and result in minimal expense to the agencies responsible for these areas.
- (7) Water pollution (total fecal coliform bacteria counts) at sites near Aquatic park was not related to the number of gulls nesting at that breeding colony over the past 11 years. In 1983, the last bathing beaches closed to swimmers because of high fecal coliform counts were those closest to the large breeding colonies on Aquatic Park. This also suggests that these gulls did not contribute significantly to the water quality problem along the Toronto waterfront. When compared to the amount of feces produced by populations of other birds and mammals in Toronto, defecation by gulls probably has a minimal impact on water quality.
- (8) Die-offs of young gulls in July, August, and September are probably caused primarily by starvation and pose no public health risk.
- (9) If unmanaged, the gull population on Aquatic Park will grow to about 180,000 pairs of nesters by 1993. This growth in gull numbers will occur primarily because the gulls will use the

proposed land-fill areas which provide ideal nesting habitat. Die-offs and the number of birds resting at some waterfront parks will probably increase. However, it is impossible to accurately predict whether the nuisance problem at public areas will become more pronounced. Such a prediction cannot be made due to the limited scope of this study.

- (10) If the gulls are prevented from nesting on newly-created and proposed land-fill areas on Aquatic Park, the number of pairs nesting on Aquatic Park will decline from 75,000 pairs in 1983 to about 41,000 pairs by 1988 and 29,000 pairs by 1993. The decline will be caused by growth of vegetation which discourages nesting by gulls and simultaneously encourages predation of gulls eggs and young.

Geese

- (1) Geese were consistently observed in large numbers at Marie Curtis Park, Bluffers Park, and the Metropolitan Toronto Zoo. These geese were probably resident at these locations.
- (2) Large numbers of geese were observed at Petticoat Creek Conservation Area after Labour Day when the park was closed. It could not be determined whether these birds were migrants or residents.

- (3) Goose feces covered substantial areas of Marie Curtis Park and Bluffers Park.
- (4) Opinion surveys of users of public areas indicated that the vast majority of visitors (83%) felt the number of geese should not be reduced. Fifty four per cent. stated that the geese made their visit more enjoyable and 33 per cent. felt that the geese did not affect their visit.
- (5) There were very few complaints about geese received at public agencies but there were some strong complaints expressed about the large amounts of goose feces at Sunnyside Beach.
- (6) Goose numbers have been managed in Toronto since 1978 by removing eggs from nesting pairs on Aquatic Park and Toronto Islands and by capturing flightless birds and transporting them to the United States for establishment of breeding populations there.

In the concluding section the following recommendations on a management program for controlling gulls/terns and geese along the Toronto waterfront were proposed.

Gulls and Terns

- (1) That gulls be prevented from nesting on newly-created and proposed land-fill areas on Aquatic park by using a combination of methods including the use of monofilament line strung above potential nesting areas, planting of dense woody vegetation such as cottonwoods and willows to make the area unsuitable for gull nesting, erection of visual barriers which may discourage nesting, and egg removal when necessary.
- (2) That Common and Caspian Terns nesting on Aquatic Park be protected and encouraged to continue nesting on the site through management of nesting areas.
- (3) That nuisance problems with gulls at public areas be dealt with at specific sites by using a combination of monofilament lines to prevent birds from using preferred areas and by posting signs to direct users to feed gulls only in certain restricted areas.

Geese

- (1) That the management of geese be expanded to include Marie Curtis Park, the sewage treatment plant at Ashbridges Bay, and Bluffers Park. Management should continue on a yearly basis until the appropriate governmental agencies decide that the situation is under control.

As a result of the round-up by the Canada Wildlife Service of flightless adults and yearlings on June 25, 1985, 1,367 adult Canada Geese were shipped to a bird sanctuary in Oklahoma and a total of 310 goslings were sent to Thunder Bay, Sudbury and Pembroke. Canada goose eggs collected in April and June were forwarded to Fort Frances to be hatched by Ministry of Natural Resources staff to augment local stocks.

The Metropolitan Toronto Region and Conservation Authority (M.T.R.C.A.) in order to prevent Ring-Billed Gulls from nesting on certain environmentally sensitive areas at the Leslie Street Spit, as well as to facilitate construction work in areas currently occupied by gulls, has hired a falconer who will discourage the gulls from nesting, using birds of prey and other methods.

The Metropolitan Toronto Parks and Property Department in an effort to reduce the size of the Ring-Billed Gull colony at Mugg's Island, has installed monofilament wiring over the nesting areas and has carried out an egg collection program resulting in the removal of eggs from approximately 9,300 nests on June 10, 1985 and from over 12,000 nests on May 16, 1985.

Both the M.T.R.C.A. and Metropolitan Toronto Parks operations were carried out under permit from and with the complete support of the Canada Wildlife Service.

In August 1984, the effectiveness of an animal repellent in discouraging geese from grazing in grassed areas was tested at Marie Curtis Park. The repellent contains bitter ingredients which are intended to permeate the outer layer of vegetation and is recommended to control damage caused by dogs, cats, beavers, racoons, etc. Test and control plots were set up and counts of the number of goose droppings recorded on each plot were subjected to statistical analysis. The analysis indicated that the repellent did not influence the geese in their choice of grazing area. Apparently Geese, unlike many mammals, have a limited sense of taste and smell and thus are not influenced by such repellants.

The birds that inhabit the waterfront are considered to be a significant pollutant load particularly in the Western Beaches region. However, it has not yet been scientifically determined to what extent the birds contribute to bacteriological contamination.

Under Schedule 4 of the 1985 Short-Term Programme for Waterfront Water Quality Improvement funding in the amount of \$27,500 was tentatively provided for the Measurement of Non-Point Sources (geese and gulls) of Fecal Contamination and Development of Recommendations for Control.

3.2.2 Storm Water Runoff

In a completely separated system, no sanitary waste from residential, commercial or industrial developments is discharged to a receiving water without first receiving treatment at a wastewater treatment plant. However, storm water runoff resulting from rainfall events is collected from streets, lawns, yards, etc. and is discharged untreated to the receiving water.

Depending on the nature of the tributary area, the intensity and duration of the storm and the antecedent rainfall, the frequency of catchbasin cleaning and street sweeping etc., this runoff can have a varying polluttional load. Wastes washed from the area to the natural receiving waters by the storm runoff include feces from all forms of animals and birds, food wastes, rubbish, and street sweepings, phosphorous from fertilizers, and heavy metals and oils from vehicles.

Pollution resulting from storm water runoff may be discharged directly to Lake Ontario via road catch basins to pipes, ditches and natural watercourses which have received direct storm water discharges in their upstream reaches.

In the case of the Eastern beaches, outlets of 12 City of Toronto storm and combined sewers are located approximately 100' offshore at which point the storm flow. is discharged at low head and exit velocity. Studies indicate that these outfalls are located too close

to shore and that in the 24 hour period immediately following rainfall events bathers may in effect be swimming in the storm runoff.

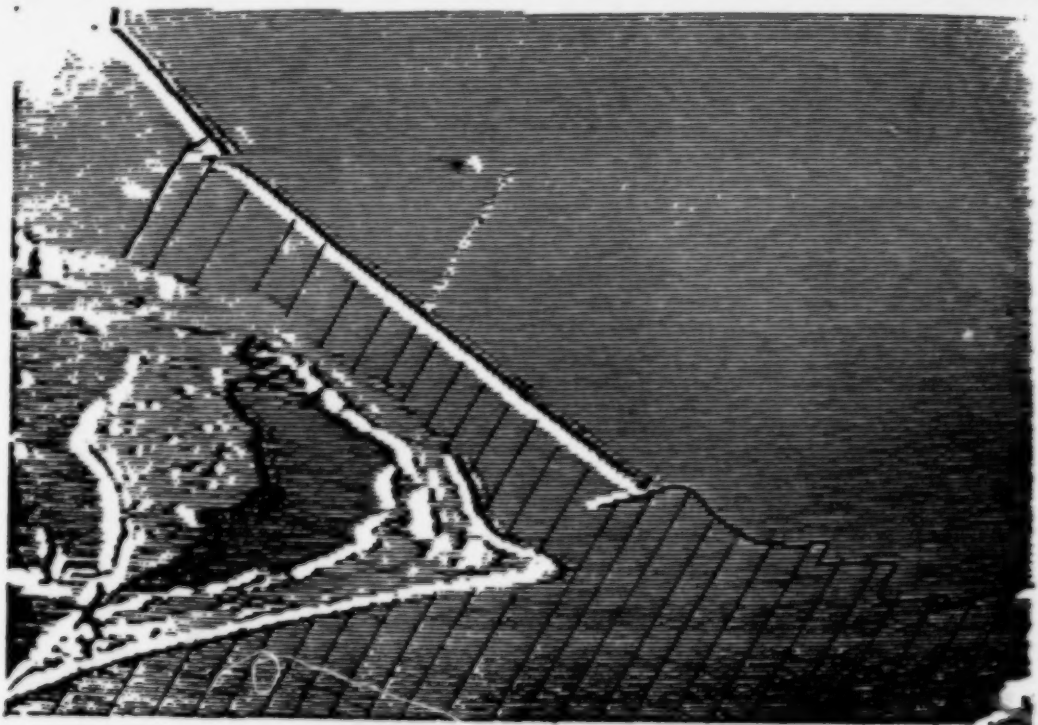
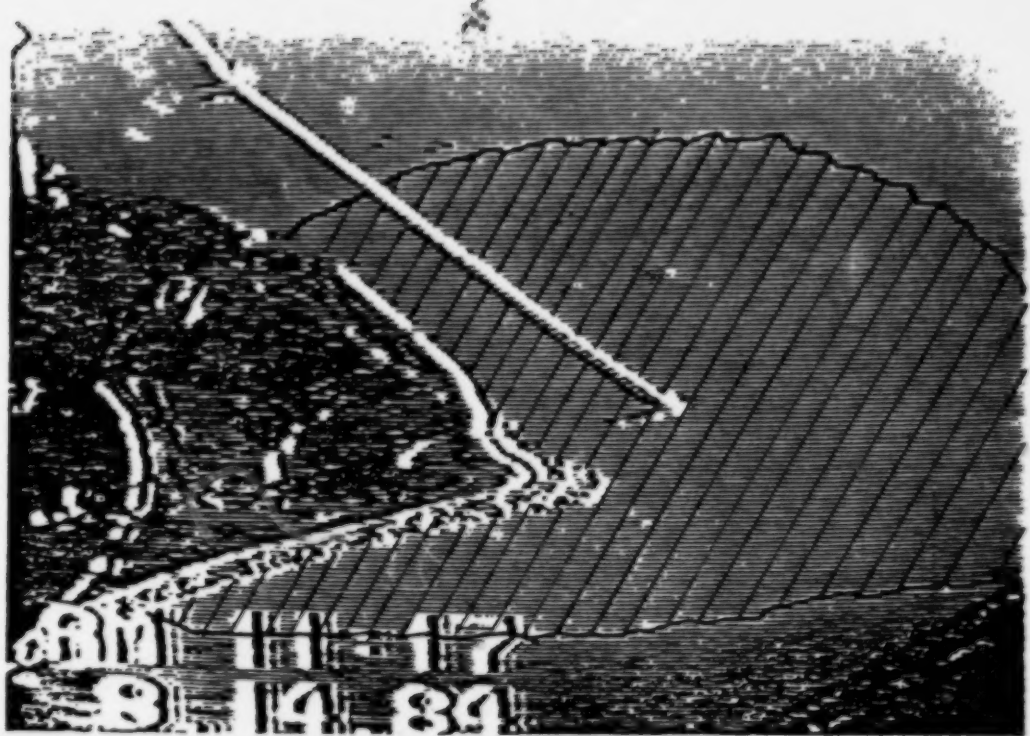
The extent to which more frequent cleaning of streets and catchbasin sumps is reducing the amount of pollutants which accumulate and wash out during a storm event, is worthy of evaluation.

3.3 Nearshore Circulation

3.3.1 Western Beaches

In the fall of 1984, under that year's Short-Term Program for Waterfront Water Quality Improvement, the firm of Kleinfeldt Consultants Ltd., was engaged by the City of Toronto to investigate the dynamics of the flow of water into and out of the nearshore area of the Western Beaches.

The results of this study indicate that "the primary environmental factor, controlling the general circulation of the coastal boundary layer of Humber Bay, and for that matter Lake Ontario is wind. Forcing of currents by discharge from the Humber River and by wind waves is a secondary effect. The diminution of wave driven currents in the nearshore of Humber Bay is a direct result of the presence of the breakwall. Indeed the primary cause of contamination buildup is the restriction of wave driven currents by



Selected photography from series taken to illustrate impact of Humber River on Western Beaches prior to construction of Diversion to direct Humber River to Lake Ontario.

the artificial structure. During the period of this study the prevailing wind conditions were different from those present in the summer. A discussion of this fundamental difference is necessary in order to understand how the results from this study can be interpreted for the purpose of predicting events during summer conditions".

Three main sources of bacteriological pollution have been identified for the purpose of this study and are listed below:

- (1) Humber River.
- (2) Combined Sewer Overflows.
- (3) The Humber Sewage Treatment Plant (STP).

Kleinfeldt's analysis indicates that the Humber River only appears to be a major contributor of contaminants during wet weather events for Psa and FS. This conclusion is based on the bacterial concentrations at sampling points, however, due to the high flows and thus discharge from the River, relative to other point sources, the actual quantity of contaminants could be much higher. It should be remembered that concentrations will be reduced further by dilution of the dispersing effluent plume.

The study indicates that "winter circulation patterns within Humber Bay are different from the summer such that unchlorinated discharges from the Humber Sewage Treatment Plant are brought inshore during late fall and winter. In contrast, chlorinated discharges are taken offshore during the summer months, thus allowing FC levels to be significantly lower in most cases. The Humber River FC levels appear high and drop off quickly toward the east, away from the Humber River point source, as dispersion and die off combine to reduce FC concentrations. The Humber does not appear to be a point source in fall wet weather conditions because all other sampling locations are affected by FC from other sources elevating their levels to or above that of the Humber".

Another of the point sources, combined sewer outfalls, have their locations marked on figure 1 and 5. Water quality data obtained for this study indicate that sewers W10 and W15 as sources of FC during wet weather. Further study and water sampling should be conducted in and around these outfalls to determine their relative importance as a FC source.

A source of bacterial contamination on the beaches was thought to be Grenadier Pond, via the Grenadier Pond Outlet which drains directly into the protected area. The discharge from this outlet was sampled after the storm of December 12, 1984, and comparison of its water quality with that taken at other locations indicates that this outlet is not a significant source of pollutants. In fact, water entering the beaches area from this outlet is actually very clean.

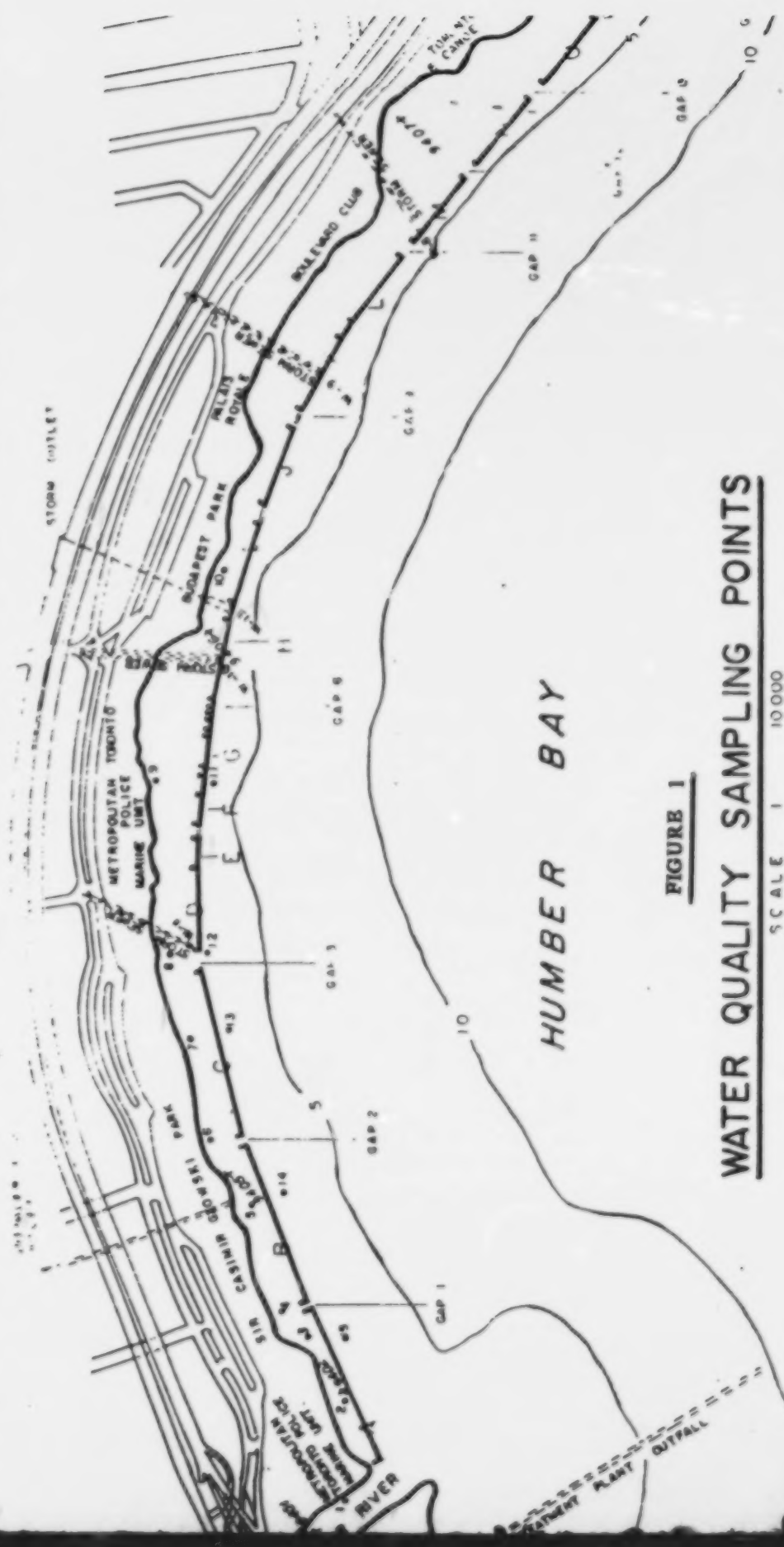


FIGURE 1

WATER QUALITY SAMPLING POINTS

LEGEND

- KLEINFELDT SAMPLING POINTS.
- X DEPT. OF PUBLIC HEALTH SAMPLING
- W8,9,10,13 STORM OVERFLOW.
- W-11 + GRENADIER POND OUTLET - STORM OU
- A - O BREAKWALL LETTERS

Diffuse, or non-point, sources such as contaminated runoff from the park area, cleaning of soiled breakwalls by rain or wave action, direct input and bacteria released from disturbed sediment can all potentially contribute to water quality degradation. The consultants noted large populations of gulls and geese throughout the study area and a considerable build up of waste matter, however, the relative importance of these sources is not known. Further study is needed on the impact of waste inputs from animals of transient or permanent populations on water quality.

Salient Points from Kleinfeldt's Conclusions and Recommendations are reproduced below:

"The present water quality problems that exist along the Western Beaches are the result of two factors:

- (1) Contaminated inputs from point sources such as the Humber river and combined sewer outfalls.
- (2) The effects of the breakwall structure on nearshore circulation limiting the natural flushing action of the nearshore lake waters by wind and wave driven currents.

Bacteria levels observed on many occasions at many stations throughout the study area are not the result of natural inputs. Such levels are commonly associated with urban areas and sewage pollution in particular.

Sewage pollution resulting from the discharging of combined sewer overflows, is the primary bacterial input to this area. The sources of these inputs are without a doubt the Humber River and storm overflow sewers, in particular W10 and W13. Storm overflow sewers W8 and W9 may also be significant contributors to the water quality problem, but these are outside of the sampling area so no further comment can be made. Inside of the breakwall, flow from outfall W12 (Grenadier Pond Outlet) was sampled and although above acceptable bacterial limits, the input is clean relative to the receiving waters.

At this time, with the information available, we cannot establish the relative importance of combined sewer outfalls or the Humber River as contributors of bacterial contamination along the Western Beaches. Further study will be needed to determine loadings from each of these sources. During this study discharges from the Humber Sewage Treatment Plant are believed to have had an affect on water quality.

Some concern has been expressed in the past regarding the re-contamination of water by disturbing bottom sediments which in turn release bacterial organisms. This non-point source is not considered to be a cause of severe pollution but it can contribute to elevated bacterial levels. Other non-point sources such as contaminated surface wash were not investigated in this study.

The presence of the breakwall structure along the entire study area drastically decreased the natural ability of nearshore currents to wash away pollutants. While these breakwalls are protecting the beach from shoreline erosion, they are also contributing to degraded water quality by inhibiting flushing activity. Our data indicates a reduction in current velocity upon entering the protected area, through the gaps, from the Humber River to the Palais Royale. Reduction of velocities indicates stagnation and buildup of contaminants in this area, which is supported by some of the water quality results. Increasing the circulation and flushing activity may allow more pollutants from a given plume to enter the nearshore area but quick removal of these pollutants will follow with the higher circulation.

Based on data collected for this report, recommendations for hardworks, with the goal of improving water quality, cannot be made with absolute certainty. Further study over the course of the entire summer is absolutely necessary to obtain data that is relevant to the time of year that improvements are needed.

Before improvements to water quality can be made, the future of the Western Beaches freshwater swimming facilities must be considered. Should it be decided that swimming is a desirable and necessary component of this area then water quality must be improved by taking steps to:

- (1) Reduce contaminated effluent inputs in the nearshore area
 - (a) Separate storm sewers from sanitary sewers. Although effluent inputs may decrease there still could be some contamination from storm sewers. The current dye-testing programme should be continued.
 - (b) Develop a system which detains and collects some of the contaminated storm overflow for later release into the sanitary system for treatment by the Humber Sewage Treatment Plant.
 - (c) Study of disinfection of sewage discharges in the sewer by chlorination, ozonation or ultra-violet irradiation.
- (2) Deposit effluent further off shore to reduce the impact on the nearshore and protected area water quality.
 - (a) Extend outfalls past the areas of strong longshore currents to allow for greater dispersion time and prevent a dense plume of pollutants from entering the swimming area.
 - (b) Diffusers can be installed in connection with outfall extension to assist the dispersion of the effluent plume.

- (3) Improve nearshore circulation to allow natural processes to flush the area. If the pollution problem can be at least partially solved by assisting the natural processes, then the cost of major engineering works can be reduced.
 - (a) Removal of the breakwall would certainly improve nearshore circulation but would result in destruction of valuable lakefront recreational property by erosion. Armouring of the shoreline would prevent erosion but eliminate the sandy beach area.
 - (b) Removal of the breakwall in areas of poor recreational value would improve circulation and thus water quality in the good recreational areas (Sunnyside Beach).
 - (c) Enlarging gaps would allow for greater discharges through the gaps since our data shows the discharge is controlled primarily by gap area not flow velocity. A greater portion of each wave envelope will enter the protected area providing more energy to assist flushing activities. Shoreline erosion can be avoided by armouring the area across from enlarged gaps.
 - (d) Removal of the upper breakwall to allow the supporting rubble fill crib to act as a sill to restrict the size of wave entering the protected area, can increase

circulation, improve water quality and protect the beach from erosion.

- (4) combine one or more of the above steps for successful long-term water quality improvement

Should it be decided that swimming is not considered to be important in the future of the Western Beaches, then two courses of action can be made:

- (1) Infilling of the protected area would create a large lakeside park with only freshwater swimming facilities being absent from the present land/use state. Sailing club mooring facilities need not be altered as the infill could end around the Palais Royale. The present breakwall structure would certainly need replacing with a wall capable of containing the fill material.
- (2) Do not make any changes to the present land use pattern or structures located at the Western Beaches."

As a result of Kleinfeldt's investigations, it is apparent that further work in the Western Beaches will be required in order to obtain a more comprehensive picture of the problem in this area.

Schedule 4 of the 1985 Short-Term Programme for Waterfront Water Quality Improvement makes provision for further studies on the Western Beaches area at a gross cost of \$145,500.00 to be funded 50 per cent. by the Ministry of the Environment and 50 per cent. by the initiating area municipality or Metropolitan Toronto.

3.3.2 Eastern Beaches

The Eastern Beaches were posted with warnings by the City of Toronto Medical Officer of Health, with increased frequency during the summer of 1983. At that time, combined sewer runoff was suspected as being the main cause of elevated fecal coliforms levels on the beaches, however, the available fecal coliform data did not clearly indicate that to be the case.

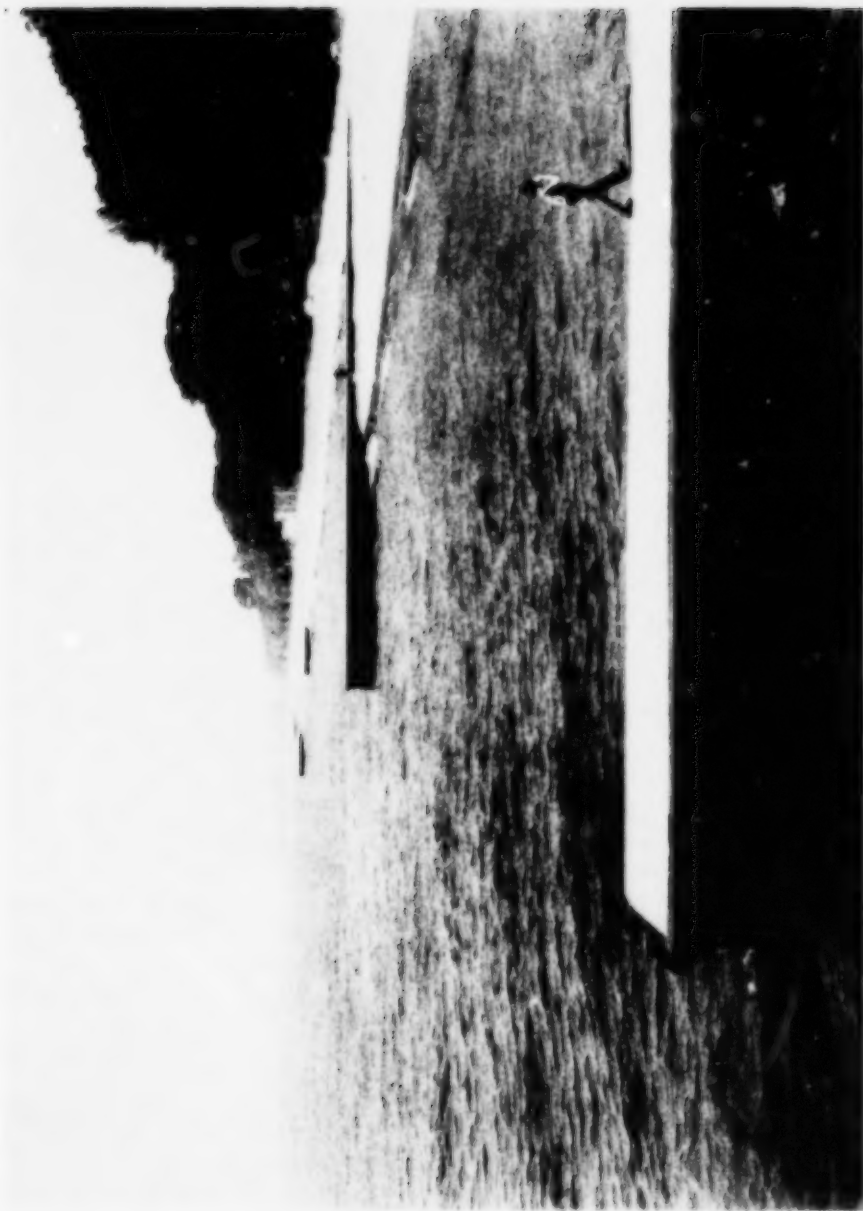
In the summer of 1984, Dorsh Consult Ltd. was engaged by the City of Toronto to develop a model of the City's sewer system east of Coxwell Avenue to be used with the QQS computer program to determine qualitative and quantitative loadings from the sewer system to the Eastern Beaches area of Lake Ontario. The model was verified via comparison of generated predicted data to actual information secured on a real time basis. Flow hydrographs and Fecal Coliform pollutographs were predicted for three actual 1984 storm events for which a complete set of lake data was available. This data was later used by Gore and Storrie as input to their models.

Concurrent with the modelling performed by Dorsh Consult Ltd. a field study was carried out by Gore & Storrie Consulting Engineers Ltd., in the Eastern Beaches area as shown at Figure 2, to determine the cause for and level of fecal coliform densities on the Eastern Beaches and to provide data on beach area transport and dispersion processes and runoff characteristics so that beach fecal coliform prediction models could be developed to assess management options to reduce the fecal coliform densities.

In order to accomplish the above objectives, daily sampling of fecal coliforms, *E. coli* and *Pseudomonas aeruginosa* were carried out by the Medical officer of Health and the City of Toronto Public Works Department at pre-selected locations at the same time each day using sampling procedures agreed upon by all parties including the Ministry of Environment.

These measurements showed the dynamic variation of these parameters in both time and space. Water movement and winds were measured locally by recording meters and extensive tracking studies (drogues) measured the water movement, dispersion and die-off rates of fecal coliforms in the beach area.

The City of Toronto Public Works Department in its report to City Services Committee dated May 8, 1985, has summarized Gore and Storrie's major observations and conclusions as follows:



EASTERN BEACHES
Combined Sewer Overflow and Storm Sewer Outfall groynes



EASTERN BEACHES
Combined Sewer Overflow and Storm Sewer Outfall groynes

- o Except for the very shallow Lee Beach area 70 to 80 per cent. of the FC occurrences greater than 100 counts/100 ml are coincident with rainfall. The effects of the runoff mostly disappeared 24 hours after the rainfall.
- o The ratio of E.coli to FC was established at 0.90 to 0.95. During runoff events this ratio decreased.
- o Corrections in the sewer system to prevent sanitary overflow eliminated the local dry weather elevated counts of FC at the Scarborough Beach.
- o In general, there was reduction in FC densities between 9 a.m. and 2 p.m. due to sunlight. In the time sequential sampling programme, 50 per cent. of the samplings showed an average decrease of about 60 per cent. therefore, sampling must take place closer to the period when the beaches are being used, i.e., around noon rather than early in the morning.
- o Transport, dispersion and die-off of bacteria were measured to determine bacteria dispersion and decay characteristics which are function of time and locations. These processes have a large variability which is not directly related to local wind conditions. It was also observed that a large percentage (60%) of water current trackings returned directly to shore although their trackings by drogue were started well beyond the end of the outfalls.

- o Shore entrapment studies indicated that entrapment eddies persist 40 to 150 metres beyond the end of the existing outfalls. These eddies transport discharges to the beach area and confine them there.
- o The tracking studies also showed that on a short-term basis (up to 24 hours) dispersion does not necessarily increase with time and bacterial levels do not always decrease with time as normally expected and found in off-shore studies of a similar nature. The explanation is that the shore region is dynamic with many variations of currents including reversals. Generally speaking, nevertheless, the effects of runoff mostly disappeared 24 hours after a rainfall.

Two time-varying two dimensional receiving water quality models were developed by Gore and Storrie for the Eastern Beaches area. These models use data collected in the 1984 field study. Although the model runs did not give consistent results for the rainfall events, they confirm the complex characteristics of the fecal coliform densities at the different beaches in response to runoff events. Further, the model prediction indicated a need to review the fecal coliform guidelines for beach areas where fecal coliform densities varied dramatically within a few hours and several hundred meters of beach. The models were used to assess the following management options for three runoff events:

- (1) Existing condition.
- (2) Discharges from E-4 and E-8 removed.
- (3) Outfalls E-4 and E-8 relocated 130 m offshore.
- (4) Outfalls E-3 to E-5 combined and relocated 130 metres offshore, E-8 130 metres offshore.
- (5) Outfalls E-4 and E-8 offshore, E-3 and E-5 combined and relocated 300 m offshore.
- (6) All outfalls relocated 130 m offshore.
- (7) Outfalls E-1 to E-5 and E-15 combined and relocated 130 m offshore. Outfalls E-7 to E-10 combined and relocated 130 m offshore.

The locations of the outfalls referred to above are listed and shown graphically on the maps at Figure Nos. 2 and 5.

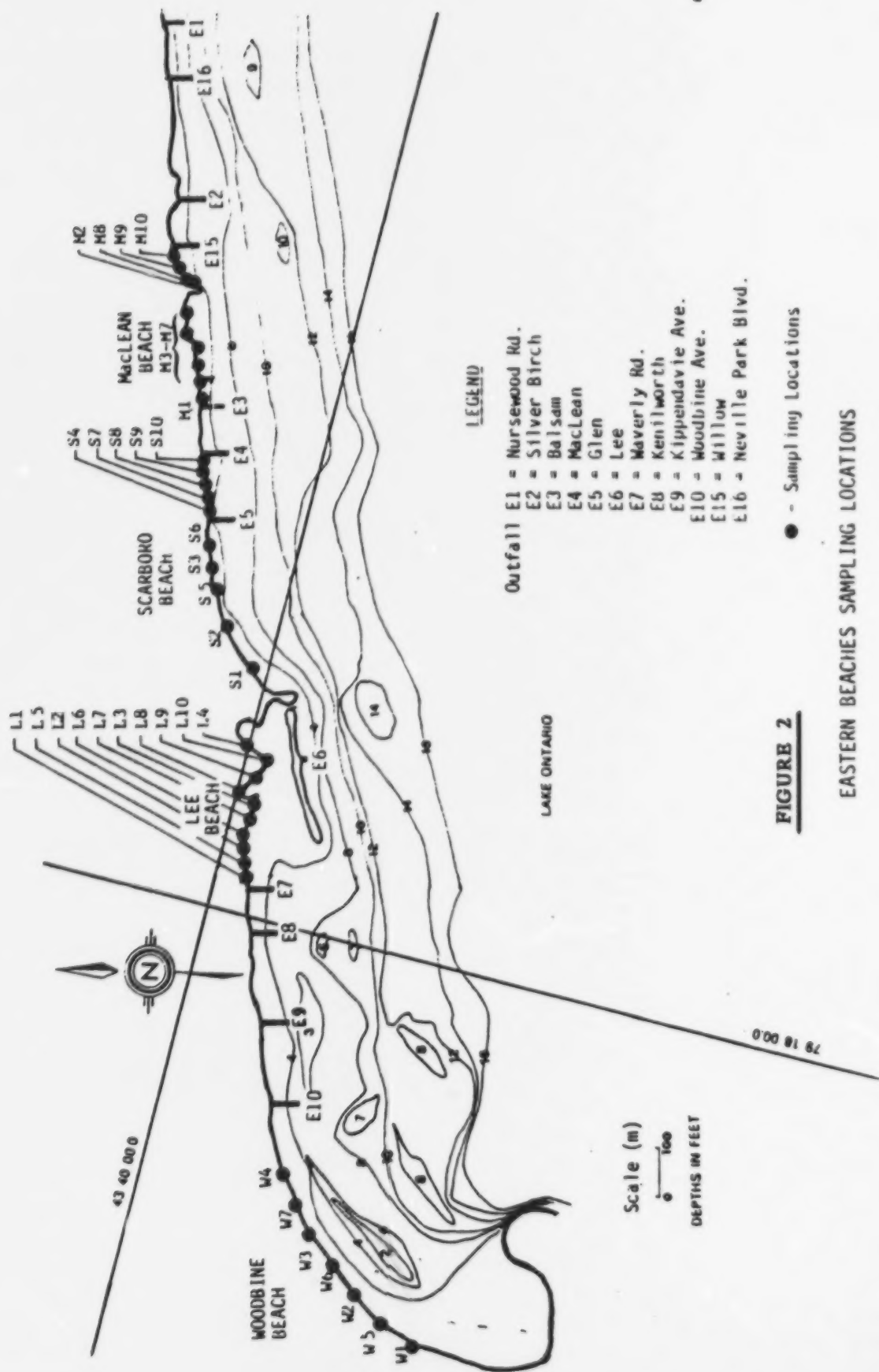
The model results provide an indication of the relative impact on the Eastern Beaches water quality of the alternative measures listed above. Gore and Storrie have summarized their analysis of the results as follows:

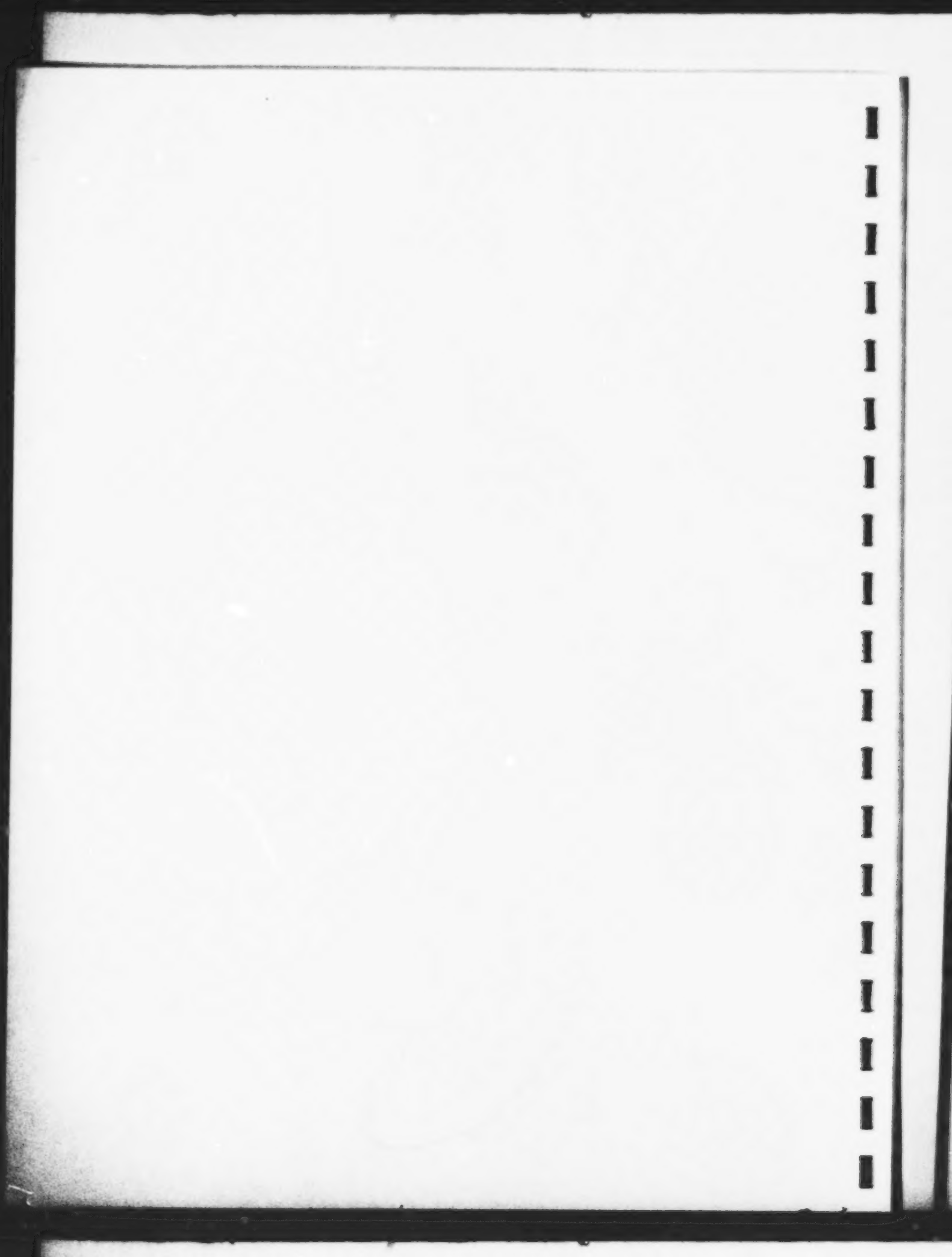
"None of the options could reduce the beach fecal coliforms to below 100 FC/100 mL for all the runoff events at any beach. However, this guideline is very conservative when applied to model predictions which are not geometric means of 10 samples and some of the options may achieve the guidelines depending on the sampling protocols.

The option with the best overall reduction in beach fecal coliform density at all the beaches is the combining of Outfalls E-1 to E-4 and E-15 into E-5 and discharging 130 m farther offshore and combining E-7 to E-10 into E-8 and discharging 130 m farther offshore. The option of relocating all the outfalls 130 m farther offshore produces the greatest reduction in the number of hours when the fecal coliforms exceeded 100 FC/100 mL at the four beaches for the storms modelled. Combining E-1 to E-4 and E-15 into E-5 and then discharging 130 m farther offshore and combining E-7 to E-10 into E-8 and discharging 130 m is the next best, in terms of reducing the number of hours of violation at all the beaches. Of the options examined, the best general option is the combination and discharge 130 m offshore.

Recommendations:

As a result of this study, we recommend the following





- (1) that further studies be carried out in 1985 to verify the model predictions and explicitly trace the runoff from outfalls onto the beaches. In addition, this study would define the offshore extent of the shore entrapment eddies.
- (2) Lee beach area be filled in.
- (3) Protocols for establishing bacterial guidelines for the beaches be evolved by the regulatory agencies. These protocols should consider the measured and predicted characteristics of the fecal coliforms in the beach areas. Fecal coliforms in the Eastern Beach area were found to vary dramatically in a few hours and a few hundred meters in response to runoff events. These protocols must be established before remedial works options to improve the beach fecal coliforms can be properly evaluated. The protocols should also provide guidance in interpreting model predictions which are generally not time and spatial averages".

The Eastern Beaches studies and modelling described above including further development of sewer system model by Dorsch Consult Ltd., development of a predictive model by Gore and Storrie and field survey work by Public Works staff was carried out under the 1984 Short-Term Programme For Waterfront Water Quality Improvement. The work was funded equally by the City of Toronto and the Ontario Ministry of the Environment and received a total Provincial contribution of \$101,649.60.

On June 17, 1985, by adoption of Clause No. 7 of Report No. 10 of the City Services Committee, City of Toronto Council approved the following 1985 programme for the Eastern Beaches as proposed by the Public Works Department.

"Water Quality Monitoring - Eastern Beaches

I understand that annual monitoring and testing work undertaken by the Medical Officer of Health will be similar to last year's programme. I also understand that the Medical Officer of Health has decided to apply the same beach closing procedure as in previous years. This procedure is in conformity with the Provincial guidelines which require beach posting when the ten day geometric mean exceeds 100 counts/100 ml at any location. The geometric mean for each location will include every sample regardless whether it was taken after a rainfall or on a dry day.

I propose that the Medical Officer of Health's monitoring programme be complemented by the provision of additional sampling locations at each of the individual beaches for which there are less than four monitoring locations, and by sampling on Fridays and Saturdays. The programme will be sufficient to amplify the information of last year's more comprehensive monitoring programme and will facilitate the eventual development of a rainfall rule for beach posting. Samples should be taken in the

middle of the day rather than early in the morning for they will be more representative of conditions when swimming really takes place. I estimate the cost for the additional sampling at \$16,000.

Recommendation:

That approval be given to supplement the Medical Officer of Health's monitoring programme to the Eastern Beaches by sampling at additional locations (Sunday through Thursday) and at all locations on Fridays and on Saturdays at an estimated cost of \$16,000.

Studies

i) Eastern Beaches

The development and calibration of a model (QQS) has been completed and which now provides for with the means to simulate the operations of the City's sewer system in the east end for a variety of storm events and the consequent bacteriological loading to the lake. The two models developed to predict the improvements in water quality for different configurations of sewer outlets under various wind and current conditions were not, however, fully calibrated and verified for lack of sufficient data. I propose, therefore, to undertake further field work. The cost for sampling, field survey work, lab analysis and equipment required by my staff is

estimated at \$30,000. I also propose to engage the services of Gore and Storrie Limited to assist my staff in the field work, data evaluation, and model calibration and application. I estimate the gross cost of consulting services at \$63,000.

Recommendations:

That City Council approve of field survey work and associated testing at the Eastern Beaches being undertaken for model development by my Department at an estimated cost of \$30,000.

That City Council approve of the engagement of Gore and Storrie Limited, 1670 Bayview Avenue, Toronto, Ontario M4G 3C2, to provide assistance to my staff in the development of a predictive water quality model for Eastern Beaches at an estimated cost of \$63,000. Payment to be made in accordance with the current Schedule of Fees as recommended by the Association of Professional Engineers of the Province of Ontario, Fee Basis "A" - time Plus Expenses."

Under Schedule 1 of the 1985 Short-Term Programm for Waterfront Water Quality Improvement, funds in the amount of \$109,000 were provided for this work, to be shared equally by the City of Toronto (\$54,500.00), and the Ontario Ministry of the Environment (\$54,500.00).

3.3.3 Lee-Leuty Improvement

In order to improve the water quality, it is proposed that 94m of the breakwater be removed, and the area north of the remaining breakwater be filled. As a result of this work, the following steps must be taken to provide protection to the boardwalk and to ensure the stability of the fill placed behind the breakwater.

- (i) construct anchor headland at Waverly Outfall;
- (ii) construct "hardpoint" approximately 60 metres east of Waverly Outfall;
- (iii) construct two protective berms at the boardwalk approximately 90 metres long in total;
- (iv) protect the west side of the fill area with a revetment structure (likely concrete rubble);
- (v) reinforce the existing breakwater;
- (vi) provide sand fill in the newly created bays.

The proposed works are indicated on Figure 3.

The west side of the fill area has to be protected, otherwise the naturally occurring embayment behind the breakwater will reform to the east a distance approximately equal to the distance that the breakwater is reduced. This is because the tip of the breakwater anchors the toe of the naturally occurring beach slope (approximately 1:30 to 1:50).

The revetment structure will have as flat a slope as practical to minimize reflection. A maximum slope of 3:1 (horizontal:vertical) is desirable. The northerly end of the revetment will be located some 65 metres from the boardwalk.

A new hardpoint, similar in construction to Hardpoint 'B', as shown at Figure 3 will be located between the Waverly Hardpoint and the tip of the revetment. This will provide two new bays similar in size to the smaller existing bays. The new headland at Waverly will anchor the side of the new westerly bay.

The two protective stone berms will be placed and sand fill will be provided to nourish the bays and improve their appearance.

In order to prevent the loss of the proposed sand fill from behind the breakwater, the rubble breakwater must be reinforced and increased in height to minimize overtopping.

The gross cost of the breakwater removal and filling of the remaining shallow area between the shoreline and the breakwater, is estimated to be \$130,000.00. Reinforcement and stabilization of the new shoreline will cost a further \$48,000.00. Funding for this work in the amount of \$178,000.00 was included in Schedule 1 of the 1985 Short Term Programme for Waterfront Water. The cost will be shared equally between the City of Toronto (\$89,000.00) and the Ontario Ministry of the Environment (\$89,000.00).

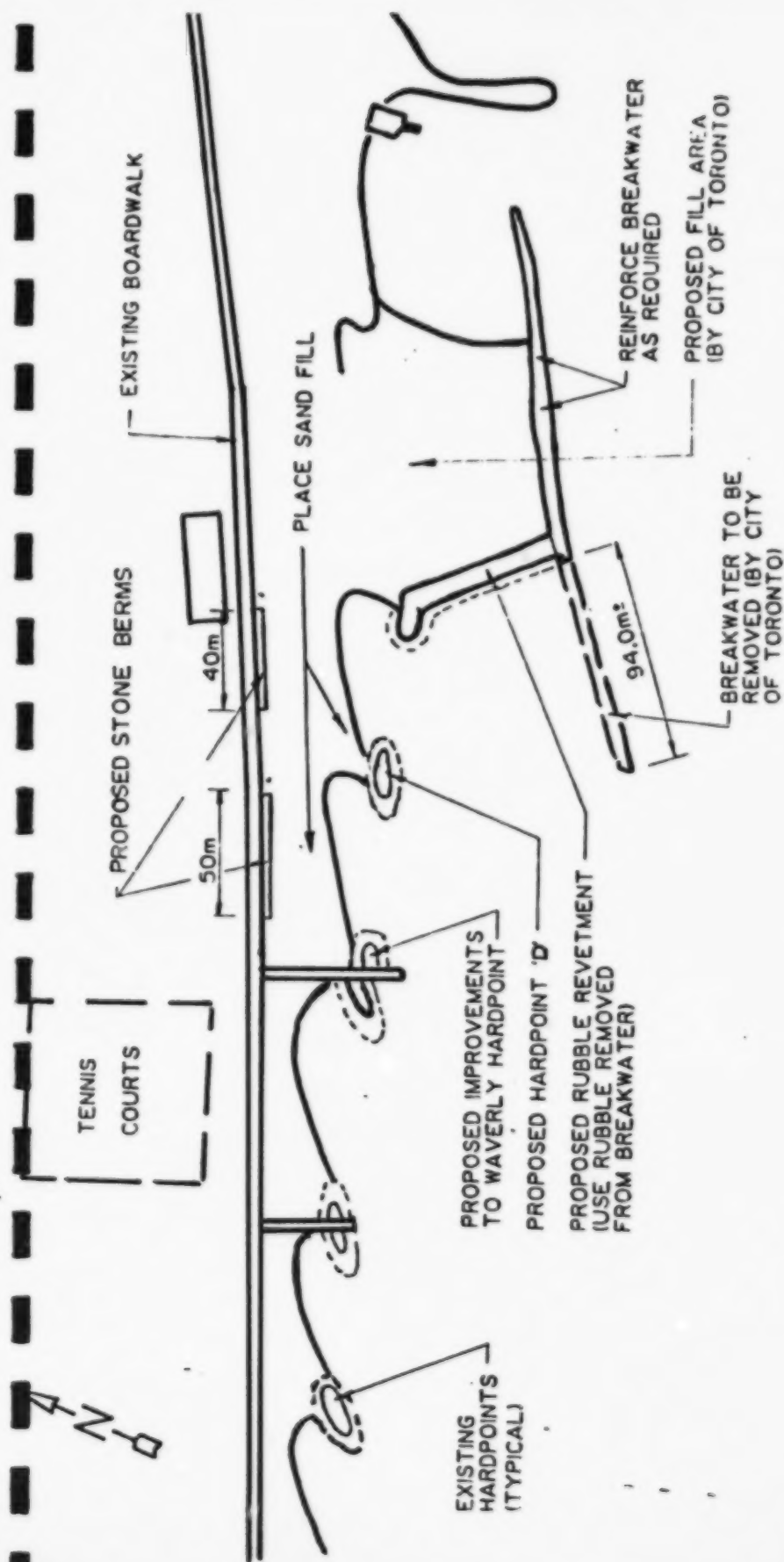


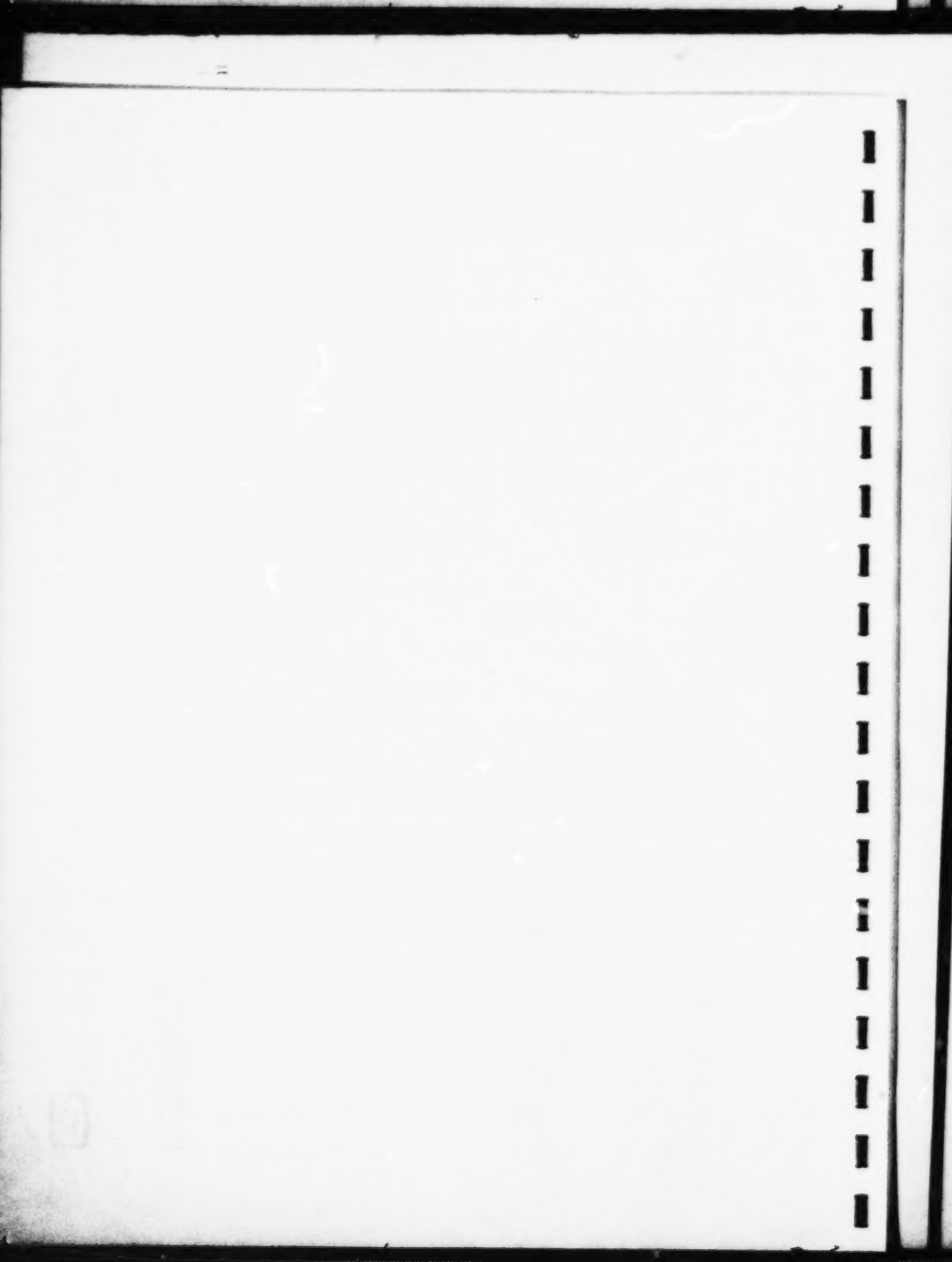
FIGURE 3

Preliminary Design, Not to be used for Construction

Scale 1:2500



Improvements Associated with
Breakwater Removal 94m



3.4 Sewage Treatment Improvements - Metropolitan Toronto

Section 6.0 of the Ontario Ministry of the Environment's Guidelines for the Design of Sewage Works, stipulates that the standard level of treatment for municipal sewage discharges to surface waters in the Province of Ontario is secondary treatment.

The method of sewage treatment within the Metropolitan Area is the activated sludge process, a secondary treatment system by which 90 to 95 per cent. of the BOD and suspended solids are removed. A flow chart for a typical Metropolitan Sewage Treatment Plant is shown at Figure 4, which illustrates the essential elements of the typical process including the outfall for discharge and dispersal of the effluent.

Chlorinated plant effluent will have at the point of discharge undergone a BOD and suspended solids reduction of 90-95 per cent. It may still contain approximately 10-20 mg/l of both BOD & SS. Recent testing indicates a fecal coliform density in the chlorinated effluent of approximately 400 mg per 100 ml.

Although the amount of pollutant per unit of effluent discharge is small, the total cumulative pollutant load considering the large volume of effluent flow, is substantial. During rainfall events when storm flows exceed secondary treatment capacity, partially treated

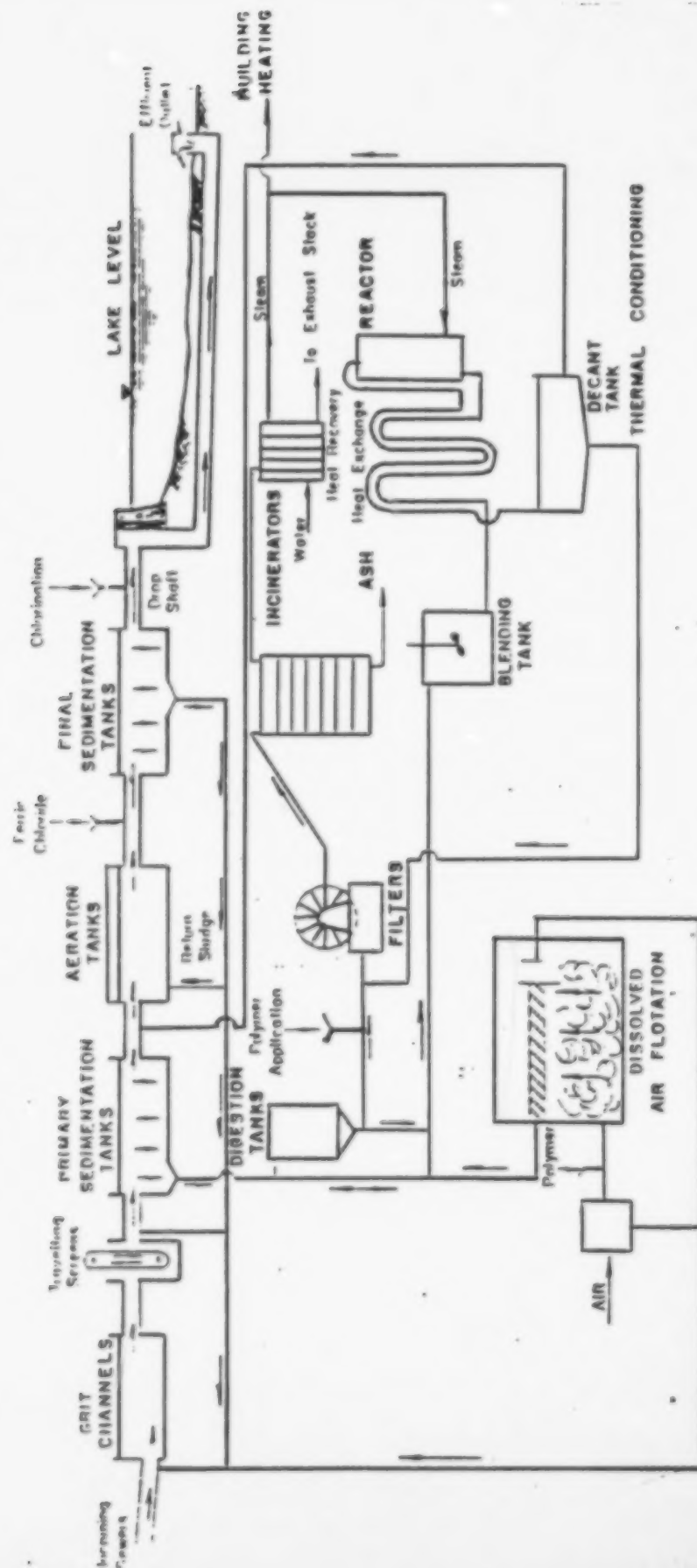
sewage (primary treatment only) is by-passed to Lake Ontario. At the Main Treatment Plant the hydraulic capacity of the outfall is insufficient to handle these storm flows with the result that flows in excess of the outfall capacity must be discharged to the nearshore area through sea wall gates.

These infrequent nearshore discharges and, to a lesser extent, the usual outfall discharges from the Humber and Main Treatment Plants may have a varying effect upon water quality of the Eastern and Western Beaches being dependant in part upon the windspeed direction, and currents prevailing at the time of discharge.

Studies of the Main and Humber Treatment Plant outfalls have been in progress since 1983 by Gore and Storrie and MacLarens Consulting Engineers respectively, which will assess and recommend locations for a new outfall and diffusion structure for the Main Treatment Plant and an extension and diffusion structure for the Humber Treatment Plant's outfall designed to achieve proper transport and dilution of the plant effluent after treatment and ensure that it does not impact on recreational use or drinking water supply.

Additional information regarding the outfall extension studies are given at Section 3.4.1 Main Treatment Plant Outfall Study and Section 3.4.2 Humber Treatment Plant - Outfall Study.

FIGURE 4
TYPICAL TREATMENT PLANT
SCHEMATIC FLOW DIAGRAM



3.4.1 Main Treatment Plant Outfall Study

The existing outfall was constructed in 1947 and since its construction, the plant capacity as well as the shoreline configuration have changed greatly and the hydraulic capacity of the outfall has become inadequate to handle high flows during periods of heavy rainfall which raises the plant flow more than $2\frac{1}{2}$ times the dry weather flow.

The purpose of this study is to find a location for a new outfall for the Main Treatment Plant and design a diffuser which will minimize the impact of the discharge on other water uses in the vicinity. The required capacity of this outfall will be determined from the hydraulic capacity of the existing treatment plant and of the sewers tributary to the plant. Minimizing the impact of the discharge will require predicting the resulting concentrations at the beaches and water intakes and defining the mixing zones. This study will predict the effect of the Main Treatment Plant discharge on the vicinity water uses.

There will be three stages to the project which are outlined below:

- (1) Assessment and interpretation of existing data and determining the need for additional data.
- (2) Determination of the required design outfall capacity.

- (3) Prediction of the effluent plumes for different locations and diffuser designs for a variety of coastal conditions.

The Terms of Reference for this study were approved by Metropolitan Council on September 13, 1983, by adoption of clause 24 of Report No. 23 and are as follows:

- (1) assemble and evaluate all existing water quality data available from the Ministry of the Environment, City of Toronto and Metropolitan Toronto with respect to existing City storm and combined sewer overflows to the Lake and the existing plant outfall. This will include the quality at the point of discharge of these sources, and the ambient quality for the receiving waters of Lake Ontario.
- (2) obtain, assemble, and evaluate all additional data necessary to supplement 1., and investigate the Lake currents and the impact of a new outfall on shoreline water quality for the recreational purposes and on intake water quality at purification plants serving the Metropolitan Water Supply System; and
- (3) establish the ultimate capacity required, considering the assimilative capabilities of the Lake in this area, and evaluate alternatives, lengths, direction, type of materials, methods of construction, and costs.

3.4.2 Humber Treatment Plant - Outfall Study

In 1957, the Humber Treatment plant was designed and constructed with an outfall conduit extending 690 metres into Lake Ontario. Since its construction, the proximity and configuration of the shoreline have changed significantly, flows to the plant have greatly increased, and the hydraulic capacity of the outfall has become insufficient to handle high flows during heavy rainfall periods.

The purpose of the study is to recommend improvements to the Humber Treatment Plant outfall, necessitated by the above-mentioned changes, and to provide improved dispersal and therefore a reduced zone of influence for the treated effluent. An appropriate new location for the offshore end of the existing outfall line will be determined, and a new design for the diffuser will achieve improved mixing and dilution of the treated effluents to current requirements of the regulatory agencies.

Effluent pumping will be necessary to overcome head losses associated with these improvements, and to raise the capacity of the plant to accommodate higher peak flows.

Site selection and design will require predicting the concentration of diluted effluents at beach areas to the east and west of the outfall and at the R.L. Clark water intake. The study will also consider the effects of all sewer outlets in the study area, and the Humber River and Mimico Creek.

The Terms of Reference for this study were approved by Metropolitan Council on June 19, 1984, by adoption of Clause No. 8 of Works Committee Report No. 9 and are as follows:

"That authorization be given to undertake a study to collect and evaluate the existing and any other required water quality and current data, to assess and recommend an appropriate site and conceptual design for an extension to the Humber Treatment Plant's outfall, to achieve proper dilution of treated effluents.

It was further recommended that the scope of the work involve:

- (1) The collection, review and analysis of all available background data concerning water quality, Lake currents, Humber Plant flows, storm and combined sewer overflows to the Lake, Mimico Creek and the Humber River with the diversion wall at the west end of the sunnyside Beach in place. A detailed analysis of the impact of a new outfall on Lake water quality, shoreline water quality for recreational purposes, and intake water quality at the R.L. Clark Purification Plant is to be included.
- (2) Evaluation of alternative outfall sites and design options to meet discharge requirements from economic, environmental, and regulatory standpoints. A detailed analysis of the preferred option(s), indicating the recommended site, and estimated cost, is to be provided.

- (3) A focus of attention on a study area bounded on the east by the Sunnyside Pavillion area and on the west by Mimico Creek, and consideration of the effects of all sewer outlets, the Humber River and Mimico Creek."

3.5 Recreational Water Quality Objectives

In 1984, the Lake Ontario Annual Beach Sampling Programme was agreed to by representatives of the cities of Etobicoke, Scarborough, Toronto and the Ontario Ministry of the Environment. Sampling was scheduled for 9 locations in the City of Etobicoke, at 5 locations in the City of Scarborough and at 40 locations in the City of Toronto. In 1985, testing of the samples was transferred from the Ministry of the Environment to the Ministry of Health.

The 1985 monitoring and testing programme undertaken by the Medical Officer of Health of the City of Toronto is similar to his 1984 programme except that this year, it is complemented by sampling at additional locations at additional times by the City's Department of Public Works. This results in sampling seven days each week and is generating data to be used ultimately to develop a predictive 'rainfall rule' for Beach posting.

The sampling and testing procedures conformed to the Ontario Ministry of the Environment Guidelines which require beach posting when the ten-day geometric mean for any location exceeds 100

counts fecal coliforms per 100 ml during dry or wet weather. Samples are collected at a point 0.3 metres below the water surface at a water depth of 1 to 1.5 metres and are intended to provide an adequate "index" of the water contaminants including bacteria and virus' to which all users of the water are exposed. The degree of exposure, of course, depends upon whether the individual swims, wades or just sunbaths.

This reactive process of testing and reporting sometimes has the effect of delaying the beach posting until after the widely varying counts have decreased. For example, daily counts at Island Beaches in July 1985 ranged from 700 to 60 two days later at the same location. The posting of the Island Beaches in July did not coincide with periods of high fecal coliform counts due to the lag time inherent in the use of the 10-day geometric mean testing and reporting procedure.

Commencing in August 1985 the Eastern Beaches are now being posted with warnings for the 24 hour period immediately following periods of wet weather as an interim measure pending development of a predictive rainfall rule which may eventually account for such factors as intensity and duration of rainfall, wind direction and strength, location with respect to outfall, type of outfall, area and nature of catchment tributary to outfall. In order to more closely reflect actual water quality fluctuations, the geometric mean is now being calculated for 10 samples taken on the same day in addition to

the practice of calculating a running geometric means for samples taken over 10 different dry or wet weather days. With the use of the 24 hours posting, consideration is being given to basing the geometric mean on 10 samples taken on the same dry weather day.

Federal authorities in Canada and some state authorities in the United States cite the criteria for water quality as the 5-day geometric mean of 200 fecal coliform/100 ml which reflects a slightly higher risk of illness in the gastro-intestinal tract.

If the criteria for posting is changed from 10-day geometric mean of 100 counts fc/100 ml to 5-day geometric mean of 200 counts f.c./100 ml., it is expected that the frequency and duration of posting would be reduced to 20 per cent. of that occurring with 100 standard.

With the change at the Eastern Beaches from the 10-day geometric mean procedure to the 24 hour warning following a rainfall event, posting should more closely reflect large and rapid oscillations in water quality associated with wet weather. It may be that a level of contamination above 100 fecal coliforms/100 ml. should be tolerated for short periods occurring infrequently during and soon after wet weather in the summer months of the year.

The above considerations should be taken into account in developing an ultimate "rule" for beach posting. The law of diminishing returns ultimately should limit action on further pollution reduction below reasonably achievable levels.

It should be noted that the standards and sampling procedures are focussed on the waters edge and up to a depth of 10 feet horizontally from waist high depth. Water quality generally improves with the distance from shore.



Brimley Road Marina Plume and Current Illustration

SECTION 4.0

1984 WATERFRONT WATER QUALITY IMPROVEMENT PROGRAMME

4.0 **1984 SHORT TERM PROGRAMME FOR WATERFRONT WATER QUALITY IMPROVEMENT**

On March 27, 1984, Metropolitan Council, by adoption of Clause No. 9 of the Executive Committee Report No. 7, authorized an agreement with the Province of Ontario Ministry of the Environment, containing terms satisfactory to the Metropolitan Solicitor, Commissioner of Works, Commissioner of Parks and Property, and Minister of the Environment, to receive and process Provincial Ministry of the Environment contributions for any of the projects outlined in the Short-Term Programme which was a part of the above-noted report. A copy of this report may be found at Appendix "A".

On March 28, 1984, the Metropolitan Corporation and the Ontario Ministry of the Environment entered into the above-noted agreement whereby the Ministry advanced the sum of \$3,047,500 to the Metropolitan Corporation for the Provincial share of the costs of the Programme, as set out in Schedule I of the agreement. A copy of the agreement and Schedule I is included at Appendix "B" of this report.

Works carried out under the 1984 Short-Term Programme for Waterfront Water Quality Improvement were essentially of three different types; 1) Physical work yielding short-term impact and improvement, 2) studies to provide necessary information on

which appropriate and effective subsequent actions could be based
3) sewer separation works yielding cumulative benefits over the long term.

These works are summarized below with respect to their impact on water quality on the Beaches:

Sewer Improvements and Weir Inspections

The City of Toronto Public Works Department's programme of inspections of weir and diversion structures to prevent the discharge of raw sewage to the lake in dry weather was continued.

Improvements were made to the diversion structure at Queen Street East and Kenilworth Avenue that will now prevent overflows from occurring during minor rainfall events.

Reconstruction of the weir at Maclean Avenue and Queen Street East was completed in July 1984. The new structure will reduce the frequency of storm overflow events reducing the annual polluttional load to the Eastern Beaches.

Weekly inspections and sampling of the 12 outfalls discharging to the Eastern Beaches area during dry weather in the Summer of 1984 have been conducted. To-date all known cross connections have been corrected.

While remedial works have been carried out in the Lee Avenue drainage area, further investigation of this storm system and the Waverly Road storm sewer are currently underway to determine if additional sources of sanitary flow exist.

The City of Scarborough has started an investigation to locate their source of sanitary flow entering the City of Toronto's storm system from Scarborough.

Data collection and analysis of sewer outlets along the Humber River and Lakefront initiated by the Toronto Area Watershed Management Strategy Study (TAWMS) have been completed. As a result of this investigation, various cross connections were detected and the status of the remedial work is as follows:

- In the Humber drainage area remedial work to the South Kingsway sewer system has been completed. Dye testing has been completed in the Bloor Street West system and one cross connection has been identified.

In the City of York, work is still underway involving two sewer outlets. Despite extensive dye testing, they have, to date, established cross connections in only one of the two outlets.

- Work to correct cross connections to the drainage system in the C.N.E. Stadium has been completed.

- Corrective works associated with the Glendale-Sunnyside storm system (Outfall W-13) have been completed for two out of three tributary area and investigation to locate these sources continues.

Investigation of water quality in sewer outlets into the Don River has been completed and the problem points have been identified. Work to correct the drainage problem at Front and Mill Streets and at Queen and Gerrard Streets has been completed. Further investigation to determine the remaining cross connections is currently on-going in connection with the TAWMS study.

Diversion of Grenadier Pond

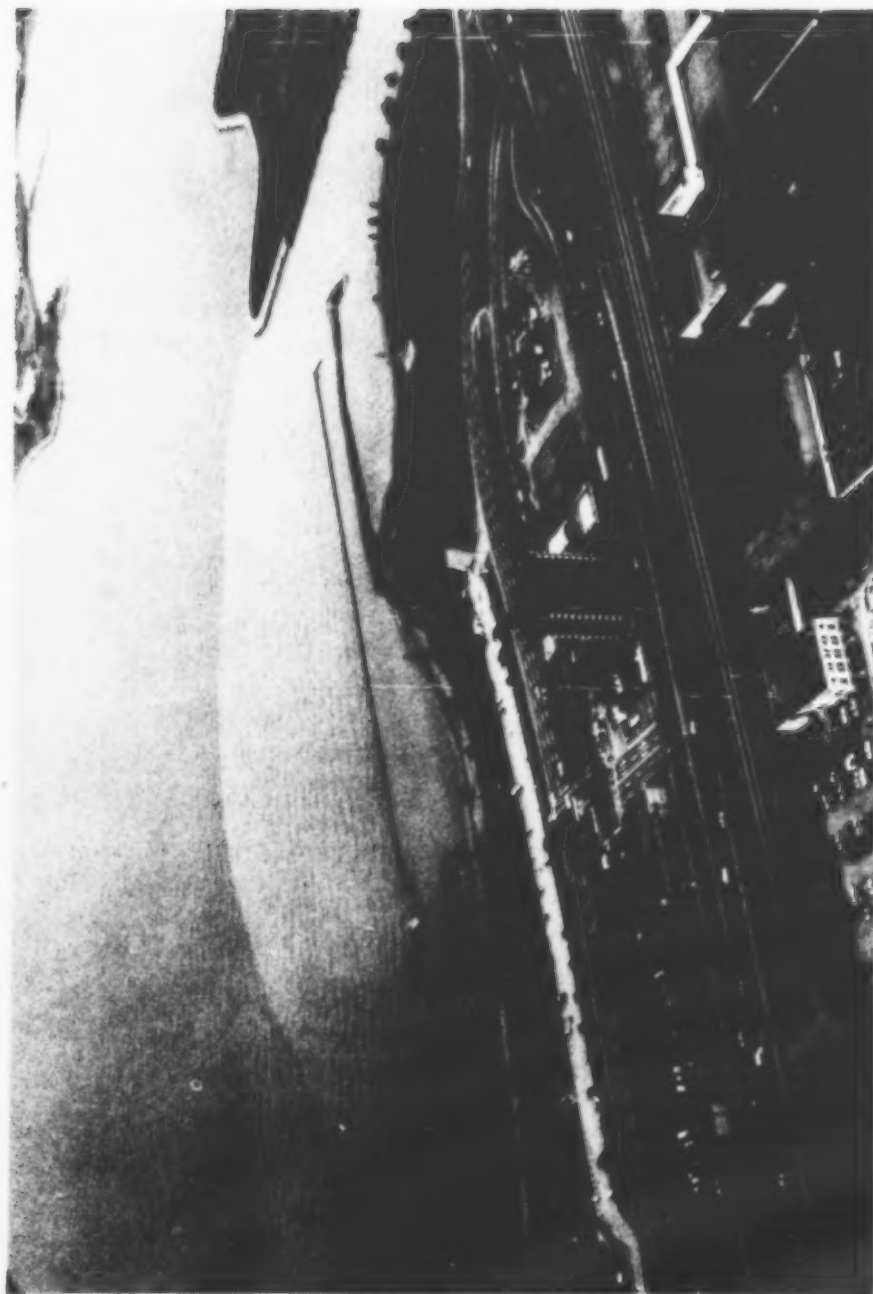
Structural work for the diversion of flow from Grenadier Pond to the Humber River was carried out in 1984. Flow is being diverted again in 1985. No extension of the Ellis Avenue storm sewer will be undertaken until an evaluation of the effect of this Grenadier Pond Diversion and other impacts on beach water quality has been carried out.

Improvements to Shoreline and Shallow - Western Beaches

Improvements to the shallows and shoreline at the Western Beaches were completed in 1984 by the City of Toronto Public Works Department. Work involved the removal of shoreline debris as well



Western Beaches shoreline debris



Humber River Plume impacting Western Beaches and Breakwater openings

as the replacement of grass areas with sand for a distance of 50 feet from the then existing shoreline along the entire length of Sunnyside Beach.

Humber River Diversion

The Humber River diversion, designed to direct flow from the Humber River farther out into the lake, away from the area behind the breakwater, was completed in 1984 by the Metropolitan Toronto and Region Conservation Authority.

Kleinfeldt Consultants Ltd., in their report entitled "Impact of the Breakwall on The Western Beaches Nearshore Circulation and Water Quality", have stated that sewage pollution resulting from combined sewage overflows in the primary bacterial input to this area (inside the breakwall) and that the sources of these inputs are without a doubt the Humber River and storm overflow sewers, in particular W10 and W13, as shown on figures No. 1 and 5. However, the Consultants advise that at this time, with the information available, they cannot establish the relative importance of combined sewer outfalls on the Humber River as contributors of bacterial contamination along the Western Beaches, and that further study will be needed to determine loadings from each of these sources. Additional studies proposed under the 1985 Programme are discussed at Section 5.

Combined Sewer Overflow, Storm Sewer Outfalls and Predictive Modelling for the Eastern Beaches

On the basis of data existing during spring 1984, it could not be determined as to whether or not the extension of existing combined sewer and/or storm sewer outlets would provide significant water quality benefits to the Eastern Beaches. Therefore, a comprehensive study by the City of Toronto was undertaken under the 1984 Short Term Programme for Water Quality Improvement.

The firm of Gore and Storrie was engaged to develop a model which could be used to predict the improvements in water quality for different configurations of sewer outlets under various wind and current conditions in the lake. Extensive sampling and field survey work was performed at selected locations in four beach areas by staff of the Departments of Public Works and Medical Officer of Health.

The firm of Dorsch Consult Ltd., was engaged for the further development of a model (Q.Q.S.), which simulates the operation of the City's sewer system and the Metropolitan Corporation's interceptor system under various actual storm events and the consequent bacteriological loading to the lake. Model development is complete and its accuracy has been verified using three actual 1984 rain events for which a complete set of lake data were available.

Data from Dorsch's QQS model were used as input into two models, developed by Gore and Storrie for the determination of bacteria dispersion and decay processes on the City's Eastern Beaches. Preliminary model runs have been carried out using off-shore current meter readings, limited near-shore current data derived from drogue and trace studies, and the loadings computed by the QQS for three 1984 rainfall events. The model runs did not give consistent results for the rainfall events which is attributed to the complexity of the near-shore current conditions on the Eastern Beaches and to the limited data base available to date. The model results, however, do provide an indication of the relativeness of alternative measures with respect to their impact on Beach water quality. These model results are discussed in greater detail at Section 3.3.2.

Further sampling and tracking study work is most definitely required to provide adequate data to allow final calibration and verification of the lake models. Provision for these further studies is included in the 1985 Short Term Programme For Waterfront Water Quality Improvement, and is discussed in greater detail at Section 5.

Study of the Western Beaches

In the fall of 1984, the firm of Kleinfeldt Consultants Ltd., was engaged by the City of Toronto, under the 1984 Short Term Programme for Waterfront Water Quality Improvement, for the

purpose of investigating the controlling factors affecting the flows of water into and out of the near-shore area of the Western Beaches, protected by the breakwater, and assessing the impact of sediment deposits and alternative courses of remedial action. A limited water sampling programme was carried out, as part of the study, to supplement water current data and to give a greater understanding of the relationship between water quality and currents.

The results of this study have been summarized by the City of Toronto Public Works Department in Clause No. 7 Report No. 10 of to City Services Committee as follows:

"For the study period, the drogue studies clearly indicated that the predominant dynamic force driving the current within the breakwater is the current outside the breakwater. But, at the same time, these studies show that a reduction in current velocity occurs upon entering the protected area through the gaps in the breakwater. This reduction in velocity contributes to stagnation and build-up of contaminants in this area.

In view of the interdependencies between winds and Bay and near-shore currents, year-round records for currents in the Bay and relevant meteorological records for winds were analyzed. These records indicated that there is a substantial difference in velocities and directions for both winds and currents between the Summer

months, and the Fall and Winter period. Therefore, the findings resulting from the drogue studies undertaken in October and November of 1984 are not applicable for the Summer months.

A surprising result of the analysis of bacteria sampling was that even during dry weather periods the bacteriological contamination outside of the breakwater was higher than inside the breakwater. This was confirmed on two days in early April 1985. The sampling this Spring has also shown substantially lower FC concentrations than in Fall of 1984; this may be related to the seasonal chlorination period (April to September) of the effluent from the Humber Sewage Treatment Plant which is undertaken on a seasonal basis. These higher FC densities outside the breakwater indicate one or more sources distinct from the sewer outfalls, since sampling was carried out during dry weather. Further effort is being made to the impact of the Humber River and the Humber Sewage Treatment Plant in relation to other contributions.

Although the study provided relevant data pertaining to the near-shore dynamic processes and the contamination level occurring during the Fall and Winter period, it is not applicable to the Summer months. Therefore, further collection of data on currents inside and outside the breakwater, and data on bacteriological contamination levels occurring during dry and wet weather periods of the Summer season, are required."

Provision was allowed in the 1983 Short Term Programme for Waterfront Water Quality Improvement for further studies of this nature, the details of which are presented at Section 5.

Sewer Separation Programme

On December 6, 1983, prior to approval of the 1984 Short Term Programme (March 27, 1984), Metropolitan Council, by adoption of Clause No. 5 of Report No. 33 of the Metropolitan Executive Committee, and subject to appropriate amendment by the Province of Section 62 of The Municipality of Metropolitan Toronto Act, approved an increase in Metropolitan Toronto Sewer Separation Subsidy, with the objective of assisting acceleration of local municipal sewer separation programmes. Under this authority, subsidy payable to the Borough of East York, and City of York, was increased from 20 to 40, or from 25 to 50 per cent. of the net cost for a two-year period following legislative amendment (May 29, 1984), and without reduction due to special Federal grants in determining net cost. Subsidy to the City of Toronto was increased from 20 to 40 per cent. on two specific projects tendered in 1984.

During 1984, sixty-nine sewer separation projects were approved incurring a total of \$ 5,380,914.50 in Metropolitan Toronto Combined Sewer Separation Subsidy. Although this figure is liable to adjustment up or down as finalization takes place in respect of commitments approved. Project costs broken down by area municipality are as shown at table 1 below:

TABLE I
1984 SEWER SEPARATION FUNDING SOURCES

	GROSS COST \$	MOE MTC SHARE \$	FEDERAL SHARE \$	METRO SHARE \$	LOCAL SHARE \$
CITY OF TORONTO	7,842,500	3,153,750	500,000	1,221,487	2,857,263
BOROUGH OF EAST YORK	6,297,351	1,341,950	1,500,000	2,477,750	977,651
CITY OF YORK	5,278,500	2,683,800	1,500,000	1,293,450	198,750
CITY OF SCARBOROUGH	1,428,100	579,500	-	278,277	570,323

The 13 Sewer Separation Projects receiving Ministry of the Environment funding under the 1984 Short Term Programme for Waterfront Water Quality Improvement are summarized separately at Table 2.

These 13 storm sewers will eventually provide separation for areas presently connected to the Combined Trunk Sewer System; pollution overflows to local watercourses will be reduced, as will the amount of storm runoff directed to Metropolitan Toronto Sewage Treatment Plants.

Provision has been allowed in the 1985 Short Term Programme for Waterfront Water Quality Improvements for a further \$2,900,000.00 Ministry contribution for accelerated sewer separation works in 1985.

An amount of \$4,000,000.00 was provided in the Metropolitan Works Department 1985 Capital Works Programme for payment of Metropolitan Toronto Combined Sewer Separation Subsidy in 1985. A copy of our proposed 1986 Capital Works Programme Water Pollution Control Division is included at Appendix "C" which gives estimated sewer separation requirements for the period 1986-1990.

There will be no federal contribution toward sewer separation in 1985.

4.7 Study of Sediment Impact On Water Quality and Aquatic Life

In 1984, the Metropolitan Toronto and Region Conservation Authority initiated a study to address the role of river-borne sediments with respect to contaminant loading, transport and biological availability in Lake Ontario waters.

The firm of IEC Beak was engaged using 50 per cent. funding provided under the 1984 Short Term Programme to carry out a literature search examining major aspects of sediment-contaminant associations using information relevant to the Lower Great Lakes and Metropolitan Toronto area.

The Consultant's recommendations and conclusions arising out of their Study of Sediment Impact on Water Quality and Aquatic Life are reprinted below:

"River-borne sediments play a significant role in determining loadings, dispersal and aquatic fate of certain contaminants. Contaminants such as PCBs and organochlorines, phosphorus and trace metals commonly enter river systems in association with sediments. Actual loadings are dependent upon land use activities, terrestrial to aquatic geochemical transfer rates and total sediment input. Within rivers and lakes sediment binding and deposition may act as an important mechanism for removing contaminants from the water column, and thus decreasing their availability to biota. However, resuspension of deposited sediments through dredging, wind or wave action may reintroduce contaminants into the water column thereby increasing their bioavailability. On the other hand, for those contaminants which form unstable complexes with sediments, river-borne sediments may simply act as a transport and dispersal medium.

There are many aspects of sediment-contaminant associations which require further investigation if ultimate pollution potential is to be determined. In general, site-specific information for the Metropolitan Toronto area concerning sediment loading, sediment-associated contaminant sources and contaminant bioavailability is lacking.

Based on the results of this preliminary literature review, the following recommendations are made:

- o copies of this report should be forwarded to the TAWMS Steering Committee so that they may consider incorporation of various study aspects into existing or planned programs;
- o major sources of sediment input to Toronto area rivers should be identified, and sediment quality at the river entry point assessed;
sediment dispersal within the rivers should be examined by
- o means of fluorescent dyes or other available techniques;
- o key depositional areas within the river systems should be identified and protected; and
- o sediment bioassay techniques currently being developed by the Ontario Ministry of the Environment, should be applied to sediments at various locations in the Don and Humber Rivers and the Lake Ontario waterfront area."

Improvements to Ashbridges Bay Park

Metropolitan Council on September 11, 1984, by adoption of Clause No. 44 of Executive Committee Report No. 20, authorized the Metropolitan Toronto Parks and Property Department to carry out improvements to the beach at Ashbridges Bay Park, at a gross cost not to exceed \$100,000.00; \$50,000.00 to be provided from the

Contingency Account and a further \$50,000.00 from the 1984 Short Term Programme for Waterfront Water Quality Improvement.

The work which was undertaken in October 1984, involved reshaping the underwater and shoreline profiles in the area, as well as dredging of in excess of 10,000 cubic metres of material and replacement with clean sand fill.

A significant improvement in the stagnant water situation occurred as a result of this work.

1984 Short-Term Programme Final Costs Payment Schedule

The following procedure for the disbursement of Provincial funds was approved by Metropolitan Council on May 25, 1985:

- o 50 per cent. of the estimated Ministry of the Environment contribution will be paid following provision, to our satisfaction, of the description of the work, estimated gross and net costs, commencement and completion dates, and advice that all necessary approvals have been obtained;
- o a further 35 per cent. of the estimated Ministry of the Environment contribution will be paid following provision of a statement confirming that 50 per cent. of the work has been completed;

- o the remaining 15 per cent. of the Ministry of the Environment contribution will be paid following provision of a final statement certifying that all work has been completed, and the final actual gross and net costs of the work; and

an exception will be made in the case of beach management equipment purchases, where the full Ministry subsidy will be advanced following provision by the applicant of proof of purchase arrangements.

Cost Summary

The total Provincial contribution for which projects in the 1984 Programme were eligible calculated on the basis of:

- (a) for sewer separation projects - Ministry of Transportation & Communications Direction C1, dated 1978-17-01 regarding "Subsidy on Storm Sewer Construction";
- (b) for all other projects - fifty per cent. of gross costs, except for the Humber River Diversion project which is 55 per cent. of gross costs.

Amounted to \$ 3,100,852.79, thereby exceeding by \$ 53,352.79 the total funding allocation provided under the agreement.

Of the \$650,000.00 allocated for the Beaches Clean-up, \$535,214.43 was expended leaving an uncommitted balance of \$114,785.57.

In the case of the sewer separation work, the amount of Provincial contribution eligible amounted to \$ 2,565,638.36 exceeding the allocation of \$ 2,397,500.00 by \$ 168,138.36.

The net shortfall (\$ 53,352.79) was therefore applied against sewer separation works only, and was apportioned among the City of Toronto, City of York and Borough of East York on a pro-rata basis.

Provincial contributions authorized under the agreement are summarized at Table 2.

As the programme progressed, it became evident that as a result of tenders coming in below estimate and due to deferral of certain other items of work, the total Provincial contribution of \$3,047,500.00 could not be utilized without the introduction of supplementary projects.

As allowed for under Clause No. 7 of the agreement, the following additional items were added to the Programme with the approval of the Ministry of the Environment:

- o Rotherham Phase I Trunk Storm sewer
- o Rotherham Phase II Trunk Storm sewer

- 70 -

- o Westlake Local Storm sewer
- o Kleinfeldt Study on sediments and circulation
- o IEC Beak Study on contaminants and sediments
- o Improvements to Ashbridges Bay.

TABLE 2
THE MUNICIPALITY OF METROPOLITAN TORONTO
WATERFRONT WATER QUALITY IMPROVEMENT PROGRAMME 1984-85
SCHEDULE OF DISBURSEMENTS
FROM MARCH 28, 1984 TO SEPTEMBER 3, 1985

DESCRIPTION OF PROJECT

Beaches Clean-up

CITY OF TORONTO

Diversion Grenadier Pond	\$ 31,512.32
Shoreline & Shallows	87,547.61
Beach Clean-up (Parks)	65,513.81
Purchase Mech.Equip. (Parks)	49,293.97
Circ. & Sed. Study - Kleinfeldt	22,500.00

Study of Storm Outfall Impact

S.S. Model - Dorsch	21,796.50
Predictive Model - G & S	42,497.86
Field Survey Work	37,355.24
Bird Control	0.00

Total Toronto	<u>358,017.31</u>
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M.T.R.C.A.

Humber River Diversion	<u>104,225.00</u>
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<u>Other Work</u>	<u>0.00</u>
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CITY OF ETOBICOKE

Purchase Mech.Equipment	<u>19,491.12</u>
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METROPOLITAN TORONTO

Improvement to Ashbridges Bay (Parks)	50,000.00
Contaminants & Sed. Study - IBC BEAK (Works)	3,481.00

Total Metropolitan Toronto	<u>53,481.00</u>
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TOTAL BEACHES CLEAN-UP	<u>\$ 535,214.43</u>
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THE MUNICIPALITY OF METROPOLITAN TORONTO
WATERFRONT WATER QUALITY IMPROVEMENT PROGRAMME 1984-85
SCHEDULE OF DISBURSEMENTS
FROM MARCH 28, 1984 TO SEPTEMBER 3, 1985

DESCRIPTION OF PROJECT

Accelerated Sewer Separation

EAST YORK

Springdale	\$ 119,086.00
Wiley/Donmore	167,421.51
Pape	200,490.24
O'Connor/Woodbine	268,318.78
Westlake	129,346.11

Total East York	884,662.64
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YORK

North Branch Phase V	110,184.07
North Branch Phase VI	223,576.25
North Branch Phase VII	162,774.06
North Branch Phase VIII	124,038.73
Rotherham Phase I	208,735.27
Rotherham Phase II	164,396.82

Total York	993,705.20
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TORONTO

Rosedale Valley Road	542,991.73
Avenue Road	90,926.00

Total Toronto	633,917.73
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<u>Other Work</u>	0.00
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TOTAL ACCELERATED SEWER SEPARATION	2,512,285.57
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TOTAL BEACHES CLEAN-UP	535,214.43
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TOTAL PROGRAMME	\$3,047,500.00
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SECTION 5.0

1985 WATERFRONT WATER QUALITY IMPROVEMENT PROGRAMME



5.0 **1985 SHORT-TERM PROGRAMME FOR WATERFRONT WATER QUALITY IMPROVEMENT**

The 1985 Waterfront Water Quality Improvement Programme was approved by Metropolitan Council on May 14, 1985, by adoption of Clause No.6 of Executive Committee Report No. 15. A copy of this report is included at Appendix D.

The agreement required to give effect to the 1985 Program was signed by the Metropolitan Corporation and the Ontario Ministry of the Environment on June 5, 1985. A copy of the agreement is included at Appendix 'E'. At Appendix 'F', are copies of press releases and correspondence pertaining to Provincial and Federal contributions to pollution abatement projects.

Unlike the 1984 Agreement the 1985 Programme contains five Schedules of approved projects. Schedules 1-4 pertain to beaches clean-up work and Schedule 5 pertains to accelerated sewer separation. Cost sharing arrangements vary according to Schedule and Project Classifications as shown below:

Schedule	Project Classification	Cost Sharing	
		Local	M.O.E.
1	A1	50%	50%
2	A2	75%	25%
3	B	40%	60%
4	D	50%	50%
5	-	Net cost After deduction of Metro and Provincial Share	as per MTC funding criteria

The programme proposed for 1985 and already underway is much like that undertaken in 1984 with a mix of activities including 1) physical improvements based on studies completed under the '84 Programme; 2) further studies and data collection to augment that done under the 1984 Programme and to provide information upon which to base decisions pertaining to long term action and capital expenditure; 3) ongoing sewer separation the benefits of which will continue to accrue over the long term.

Refer to Appendix D for Schedules 1-5 which form a part of the agreement and list the individual projects and funding arrangements.

Projects approved under the 1985 Programme for Waterfront Water Quality Improvement are as follows.

Schedule 1 - Project Classification A1

Western Beaches Physical Shoreline Clean-up

The clean-up of shoreline and shallows of the eastern section of the Western Beaches, consisting of the removal of undesirable rubble, stone, silt and material conducive to algae and coliform development.

Gross Cost \$125,000 M.O.E. Share - 50% is \$62,500.

Date of Commencement: underway

Estimated Completion Date: September 30, 1985

Eastern Beaches Physical Shoreline Clean-up

The clean-up of shoreline and shallows of the eastern beaches consisting of the removal of undesirable rubble, stone, silt and material conducive to algae and coliform development.

Gross Cost: \$25,000, MOE Share - 50% is \$12,500

Date of Commencement: September 3, 1985

Estimated Completion Date: October 15, 1985

Storm and Combined Outfall Predictive Model

The complimentary sampling at additional locations at each of the individual beaches for which there are less than four monitoring locations (on Sunday through Thursday) and at all locations on Friday's and on Saturday's for the Medical Officer's of Health monitoring programme:

Gross Cost \$16,000.00

Field work consisting of sampling, survey work, lab analysis and the provision of equipment required by temporary staff:

Gross Cost \$30,000.00

The engagement of services by Gore and Storrie Limited consulting engineers to assist the City in the development of a predictive water quality model for the Eastern Beaches.

Gross Cost \$63,000.00

Date of Commencement: commenced

Estimated Completion Date: January 30, 1986

Lee-Leuty Improvement

For the improvement of the water quality at Lee and Leuty Avenue it is proposed to remove approximately 95 metres of breakwater at its west end and to fill in the remainder of the shallow area between the shoreline and the breakwater.

Gross Cost \$130,000.00

As a result of the partial removal of the breakwater, reinforcement work for stability of the new shoreline:

Gross Cost \$48,000.00

Total Gross Cost - \$178,000 M.O.E. Share - 50 per cent. is \$89,000

Date of Commencement: Commenced

Estimated Completion Date: August 30, 1985

Joint Pilot Study on Chlorination and Ultra Violet Treatment

The performance of a disinfection pilot study to establish design and operating conditions for disinfection of combined sewer overflow on Maclean Avenue by high-rate chlorination and ultraviolet irradiation processes.

Gross Cost \$50,000 M.O.E. Share - 50% is \$25,000

Date of Commencement: Commenced

Estimated Completion Date: March 31, 1985

Subsidy Programme for removal of cross connections on Private
Property - Schedule 1

This matter is still under consideration by the area municipalities as
to whether or not they will implement this program in 1985.

Schedule 2 - Project Classification A2

Storm and Combined sewer outfall monitoring and investigations

A programme of monitoring sewer discharges to natural
watercourses and to Lake Ontario, including laboratory analysis, and
dye testing and installation of pollution nets for cross connection
identification in association with the TAWMS study.

Gross Cost Western Beaches	\$105,500.00
Gross Cost Eastern Beaches	<u>\$175,500.00</u>
Total Gross Cost	\$281,000.00
M.O.E. Share 25%	\$70,250.00

Date of Commencement: Commenced

Estimated Completion Date: Summer 1986

Schedule 3 - Project Classification B

Storm Sewer Modelling

This item will be comprised of sewer system studies undertaken in the Cities of Toronto, Scarborough, York and the Borough of East York by Works Department staff of those municipalities with

assistance from specialized consultants. These studies will determine the:

- o frequency and pollutant loadings of combined sewage overflow (CSO);
- o effectiveness of possible control scenarios for CSO reduction;
- o engineering feasibility and cost of promising scenarios;
- o Combined Sewer Overflow impacts on receiving waters resulting from the results a) b) & c).

Total Gross Cost	\$570,000.00
M.O.E. Share 60% is	\$342,000.00

Date of commencement - Work has commenced in the City of Toronto. Consultants have not yet been engaged in the other municipalities.

Estimated Completion Date - City of Toronto - early 1986
- City of Scarborough - March 31, 1985
City of York - March 31, 1985
Borough of E. York - March 31, 1985

Schedule D - Project Classification D

Investigations of Nearshore current patterns

The project consists of sampling, field work, lab analysis and includes the provision of equipment required: a) to collect all relevant data contributing to water circulation, inside and outside the breakwater at the Western Beaches: b) tracking of effluent plumes from outfalls after rainfall: c) detailed water sampling complementary to the Medical Officer's of Health monitoring.

The City will be assisted by Kleinfeldt Consultants Limited who will undertake detailed studies of the currents and circulation inside and outside the breakwater at the Western Beaches.

Gross Cost for City	\$22,000.00
Gross Cost for engagement of Consultant	<u>\$70,000.00</u>
Total Gross Cost	<u>\$92,000.00</u>
M.O.E. Share - 50% is	\$46,000.00

Date of Commencement: Commenced

Estimated Completion Date: October 30, 1985

Optimization of Sanitary Sewer system

On June 25, 1985, by adoption of Clause No. 42 of Executive Committee Report No. 20, Metropolitan Council approved the engagement of Doctor P. Wisner of the University of Ottawa, to undertake a study of the existing Metropolitan Interceptor System and tributary area municipality systems to identify potential optimization of the overall system, utilizing the technique of real time control, to retain and treat an increased volume of surface drainage, thus reducing the frequency and severity of combined overflows.

The study was carried out during the months of June and July 1985, under the 1985 Short-Term Programme and funded \$1,400.00 by Metropolitan Toronto and \$1,400.00 by Province of Ontario for a total gross cost of \$2,800.00.

In addition to his written report, Doctor Wisner presented in seminars held August 8 and 9, a summary of his findings and recommendations pertaining to the optimization of operation of the Metropolitan Interceptor System.

Doctor Wisner's report concluded that there was limited storage available in the Mid-Toronto Interceptor arising out of non-uniform storm water loadings which could be utilized to reduce combined storm overflows. However, the implementation of improved Mid Toronto Interceptor operation was not studied in detail and the implications for treatment plant operation and the reduction of combined sewer overflows could not be quantified. Additional studies and modelling will be required to determine more accurately the potential benefits of implementing a full real time control system and the cost thereof.

The report recommends the use of a computer screening simulator as a simple tool to improve the perception of the operating team and obtain if not the optimum, at least some improvement with respect to combined sewer overflow abatement.

It is also proposed in the report that the hydraulics of the Mid Toronto Interceptor be analyzed to assist in the operation of the Pumping Station with respect to potentially violent transient flows and sedimentation.

Combined Sewer Separation

Schedule 5 of the 1985 Short-Term Programme lists the combined sewer separation projects which are to be commenced in 1985 and which will receive accelerated funding from Metropolitan Toronto and/or the Ontario Ministry of the Environment.

In 1985, the funding sources for accelerated works are shown at Table 3 below by area municipality. Projected requirements for the period 1986-1990 are shown at Table 4.

TABLE 3

1985 ACCELERATED SEWER SEPARATION FUNDING SOURCES

<u>Municipalities</u>	<u>Gross Cost</u>	<u>M.T.C. Share</u>	<u>M.O.E. Share</u>	<u>Metro Share</u>	<u>Local Share</u>	<u>Misc. Cont.</u>
YORK	4,635,000	786,300	863,600	1,492,550	1,492,550	
EAST YORK	6,970,000	975,000	1,400,000	2,147,500	2,147,500	300,000
TORONTO	<u>2,000,000</u>	<u>0</u>	<u>292,000</u>	<u>341,600</u>	<u>1,366,400</u>	
TOTALS	<u>13,605,000</u>	<u>1,761,300</u>	<u>2,555,600</u>	<u>3,981,650</u>	<u>5,006,450</u>	<u>300,000</u>

Sewer Separation funding requirements for the period 1986-1990 are shown by area municipality at Table 4.

Adequate provision will be allowed in our 1986 Capital Works Programme to accommodate these subsidy requirements.

TABLE 4
PROJECTION OF PROPOSED CAPITAL WORKS EXPENDITURES FOR
SEWER SEPARATION CONSTRUCTION 1986 - 1990

<u>*YORK</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>
Gross Cost	2,800,000	2,160,000	2,160,000	2,060,000	2,060,000
Federal Share					
M.T.C./M.O.E. Share	800,000	800,000	800,000	800,000	800,000
Metro Share	1,000,000	340,000	340,000	340,000	340,000
Local Share	1,000,000	1,020,000	1,020,000	1,020,000	1,020,000
<u>SCARBOROUGH</u>					
Gross Cost	800,000	1,100,000	590,000	240,000	N/A
Federal Share					N/A
M.T.C./M.O.E.	310,00	420,000	230,000	90,000	N/A
Metro Share	90,000	120,000	60,000	20,000	N/A
Local share	400,000	560,000	300,000	130,000	N/A

*Estimated Requirements

TABLE 4, cont'd.

PROJECTION OF PROPOSED CAPITAL WORKS EXPENDITURES FOR

SEWER SEPARATION CONSTRUCTION 1986 - 1990

<u>TORONTO</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>
Gross Cost	5,956,000	6,879,000	3,614,000	3,034,000	2,206,000
Federal Share					
M.T.C./M.O.E. Share	1,385,000	1,478,000	958,000	804,000	570,000
Metro Share	560,000	647,000	236,000	447,000	328,000
Local Share	4,011,000	4,754,000	2,420,000	1,783,000	1,308,000
<u>EAST YORK</u>					
Gross cost	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000
Federal Share					
M.T.C./M.O.E. Share	1,000,000	1,100,000	1,200,000	1,300,000	1,400,000
Metro Share	1,000,000	475,000	450,000	425,000	400,000
Local Share	1,000,000	1,425,000	1,350,000	1,275,000	1,200,000

Beaches Chlorination

Chlorination of swimming areas at two man made lakes is in progress by Hamilton Wentworth Conservation Authority at Valens Park and Christie Park. The Chlorination has been ongoing 11 years at Valens, 10 years at Christie.

At both locations there is a swimming curtain installed (vinyl coated polyester with floatation collar) and chlorinated lake water at 5 ppm is circulated behind it. A residual of 1-2 ppm is maintained on the beach.

Gas chlorinators are used for chlorination.

The bacterial levels are checked/sampled 3 times weekly by conservation staff and twice weekly by health department for fecal and total coliform content.

Tests are often O FC and O TC when the level outside the curtain is over 100,000.

Christie has capacity for up to 6000 swimmers, Valens up to 2400 swimmers.

Installation of swimming curtains with chlorination of the enclosed beach area is one concept which warrants further study, particularly

- 86 -

for the Western Beaches where the current problem arise from the enclosure effected by the breakwater.

Other related concepts to be investigated involve the import of cleaner water from offshore, or use of the Metropolitan or City Water Supply to enhance swimming water quality.

SECTION 6.0

DISCUSSION OF RECOMMENDATIONS



6.0 DISCUSSION OF RECOMMENDATIONS:

In addition to the actual physical works undertaken during the past two years, there have also been a number of studies initiated, to provide the necessary basis for identification of the problems and alternative solutions.

Until the data and study results are fully available, decisions with respect to some alternatives must be reserved.

It should be noted that information available to date allows the following action to be recommended and alternatives to be identified for consideration.

6.1 Water Quality Objectives and Standards

The present standards based on coliform limits are more stringent than those applied in any other known jurisdiction, and as a result, our beaches are being posted with warnings with a frequency during the summer season that many would consider unacceptable.

We understand that the Ministry of the Environment (M.O.E.) and City of Toronto Medical Officer of Health are considering amending standards to include a new basis and limit for virus, possibly zero, which would drastically increase the frequency of posted warnings

and may not be achievable except by drastically increased capital operating expenditures. An epidemiological survey would be useful to assess the real health impact of the various standards before raising or lowering these standards and procedures are considered.

We will describe below action which will reduce the frequency and duration of these postings in proportion to the increasing amount of money matter available for this purpose. It remains for others to determine what recreational water quality standard is appropriate and what level of expenditure is acceptable, having regard for other municipal responsibilities and priorities. It would not be productive to increase already stringent standards to the point that they would not be realistically achievable technically and financially, nor realistic for the drainage area serving a population of 2,500,000.

A good short-term target may be to leave the present standards and accelerate efforts to meet them before applying even more stringent standards that cannot be met, except possibly over a long term, with expenditure levels that will require reduced priority and expenditure for other municipal services.

Consideration should also be given to the real health impact of adjusting our Provincial Standard and the procedures for sampling in line with those adopted by the Canada/United States Federal Governments.

The 10-day geometric mean basis for application is not an accurate and representative method for determining water quality on any given day. It should be replaced by a standard or basis of application that is more indicative of current status of the water. This can be done by extension of the "rainfall rule", by which predictive modelling allows an immediate posting after the rainfall event, followed by removal of posting that is not delayed by old geometric mean data.

However, the "rainfall rule" should not be simply superimposed on the old 10-day geometric mean rule, or there will be even more frequent beach postings with no change in water quality.

If the better and more accurate "rainfall rule" is imposed, it should be accompanied by an upward adjustment in the coliform number of 100 to the Federal Government standard of 200. The combined effect then would be a new standard that is neither more or less stringent than the former number of 100 based on a 10-day geometric mean.

Consideration should also be given to whether or not equal emphasis should be given to improving and maintaining similar water quality at all locations on the waterfront, or should it be recognized that the areas most affected by combined sewer overflows, the Don and Humber Rivers or other point sources, which are also the most difficult and costly to effect improvement, will remain posted

occasionally. Improvement work could be concentrated on areas designated for swimming. For example, the western part of the Western Beaches has not been considered a swimming area in the past by the City of Toronto Parks Department. On the Eastern Beaches, those areas furthest from combined sewer overflows are less frequently posted and more suitable for swimming.

The first part of each rainfall picks up most of the pollutants, the amount depending on the time since the last rainfall.

It should be noted that approximately 30 inches of storm water falling on our Metropolitan drainage area annually has a "washing" effect which picks up the contaminant load accumulated by human activities, vehicles, commercial and industrial, and animal pollutants that are inevitable from 2,500,000 people living in our drainage area, and conveys it to the watercourses and rivers. Our rivers and water courses will have a lower quality than the Lake Ontario waterfront. The rivers can be expected to have a higher coliform count and it may not be possible or practical to reduce it to recreational water quality.

6.2 Combined Sewer Systems

A natural priority dictates that waterfront water quality will be improved first and the rivers second.

The local municipality's sewer separation programme should be completed as soon as possible. The City of York and the Borough of East York have a considerable amount of work to do which was estimated to take as long as 40 and 20 years or more respectively, at the rate of funding prior to 1984. It is estimated that it could be substantially completed in approximately 10 years if the accelerated contributions made by the Province and Metropolitan Toronto in 1984 and 1985, and the Federal Government in 1984, are maintained.

Specifically, the Province can first assist by assuring that at least there is no shortfall in funding for their normal programmes of the Ministry of Transportation and Communications (M.T.C.) subsidy to local municipalities for new storm sewers. In the past, local municipalities have not received the full M.T.C. contribution for which they were eligible.

Also, the M.T.C. subsidies decrease as a percentage as the diameter exceeds a limit which in effect reduces this percentage contribution for the large diameter storm trunk sewers. Therefore, the M.T.C. or the Ministry of the Environment (M.O.E.) should ensure that the essential trunk sewer receives the same percentage contribution, approximately 50 per cent. of gross, as the smaller local road storm sewers now receive.

The above refers to the Province's long standing M.T.C. contribution.

In 1984 and 1985, the Province responded positively to the 1983 beach postings and provided supplementary contributions to accelerate improvements. It is hoped that the Province will be willing to continue these special contributions to water pollution control work for a five-year or more assured period, so that the local municipalities can plan a longer effective programme, than on a year to year basis.

In Metropolitan Toronto, we are fortunate to have a water supply reserve surplus which, consistent with the "user charge" and our ongoing program to place the cost of water treatment directly with the water consumer, can be used to accelerate Metro's sewage treatment improvements including the Metropolitan Toronto subsidy to local municipalities for sewer separation.

The Federal Government should return to participation in funding of essential public works capital projects which it discontinued several years ago. Previously it contributed 16-2/3 of gross cost to eligible public works projects.

The Federal Government is active in establishing objectives under the International Joint Commission and, therefore, should provide assistance to meet those objectives.

Historically, public works construction has frequently been successful in placing people productively at work, who otherwise would be receiving assistance or suffering hardship without being productive.

6.3 Western Beaches

Essentially the City of York combined sewer overflows affect the Humber River directly and, under certain conditions the City of Toronto Western Beaches only indirectly.

The recreational water quality on the Western Beaches can most readily be improved by reducing the impact of the Humber River and Humber Treatment Plant effluent and action to effect this is in progress. Improving circulation which may necessitate controlled pumping of chlorinated lake water or the Metropolitan water supply is under investigation. The possible extension of the existing Ellis Avenue combined sewer overflow will be evaluated by the City of Toronto on receipt of the current consultant's study. The elimination of the possible impact of sewage treatment effluent will be achieved by outfall improvements and extension presently scheduled in the Metropolitan Toronto five-year Capital Works Programme. It is apparent from visual examination of the breakwater and grass surfaces that pollutants from seagulls and geese are a significant factor on the Western Beaches.

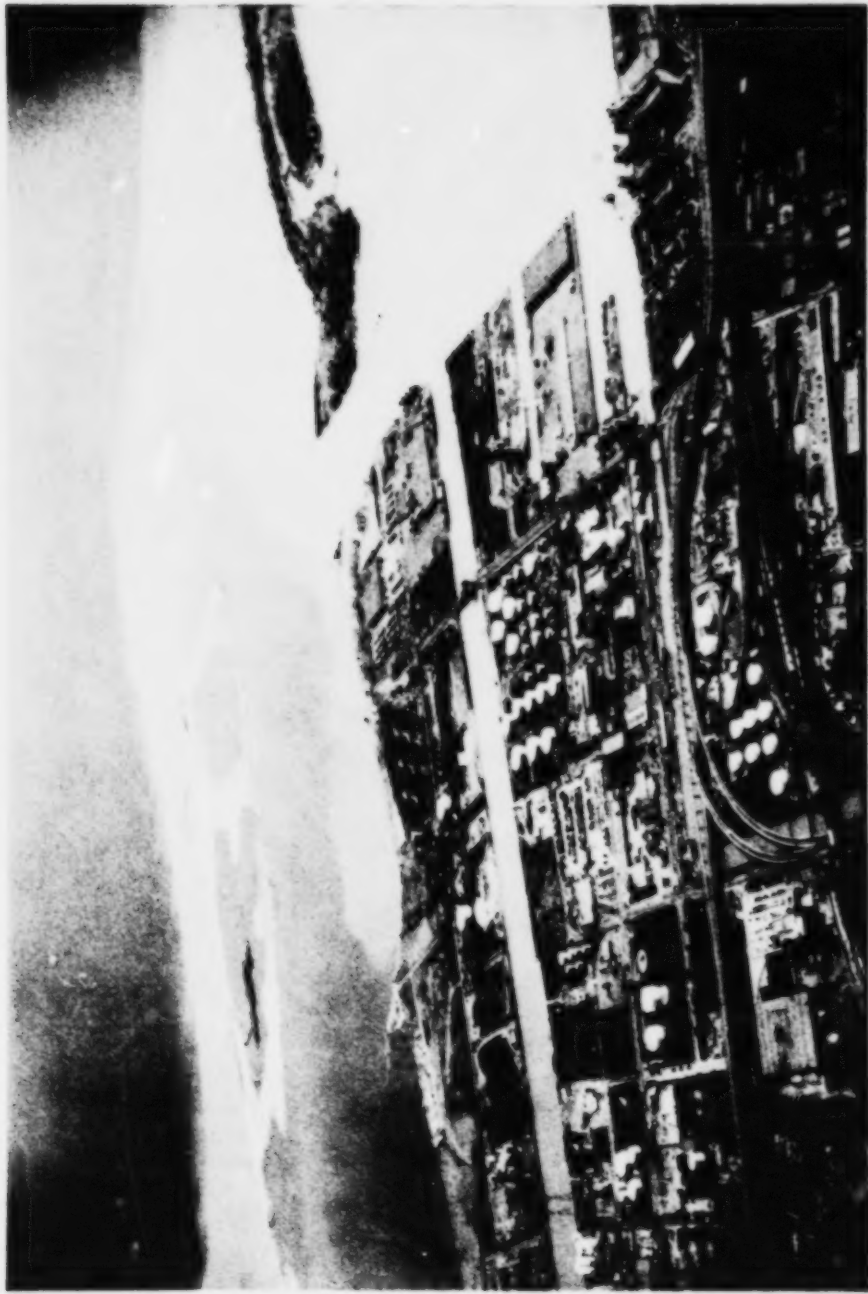
6.4 **Island Beaches and Harbour**

Essentially, the Borough of East York combined sewer overflows affect the Don River directly and, together with City of Toronto combined sewer overflow to the Central Harbour, ultimately affect the Island Beaches indirectly.

In the past the Island Beaches have been posted less frequently than the others. The long term impact of continued sewer separation by the City of Toronto and Borough of East York will improve the Island Beaches.

In addition, the optimization of the existing City and Metropolitan system particularly the Mid-Toronto Interceptor and the parallel Low Level and High Level Interceptors will be the subject of a joint review and report by the City of Toronto and Metropolitan Toronto.

Any significant reduction of combined sewer overflow that can be combined through optimization will contribute to improvement of the Harbour and Island Beaches. However, a combined storm sewer interceptor may be necessary to make a substantial improvement and to meet present recreational water standards in the Harbour and on the Island Beaches and this concept will be considered in the optimization study.



Inner Harbour Eastern Gap Plume Impacting Island Beaches



Inner Harbour Eastern Gap Plume impacting Island Beaches



Don River plume entering Inner Harbour



The Optimization Study will include the following considerations:

- (1) Reduction of City of Toronto Combined Sewer Overflows.
- (2) Future servicing requirements of the City of Toronto core area and identification of capacity available.
- (3) Possible introduction of some storm water "first wash" flow to improve the Harbour and Island beaches to the extent that sewer and sewage treatment capacity can be made available.
- (4) Reliability and flexibility of the Metropolitan Trunk System and possible additional interconnection and emergency pumping capability to assure capacity.

6.5 Eastern Beaches

The Eastern Beaches are essentially affected by the following:

- (1) Combined Sewer Overflow (C.S.O.) at MacLean and Kippendavie Avenues when storm in excess of 4 X and 16 X DWF carry raw sewage to the shoreline.
- (2) Storm Sewer Outfall (S.S.O.) at ten locations carry the pollutants from vehicular traffic, animals, birds, lawn fertilization and other human activity, and discharge approximately 100 feet

from water's edge. In effect one is swimming in storm water immediately after rain falls. Some reduction in pollutant load can be achieved through enforcement of "Stoop and Scoop" By-laws, and the potential of 1985 experimental chlorination and ultra violet treatment will be assessed to determine whether or not it has practical economical application.

The cost and benefits of extension of the ten storm outfalls and two combined sewer overflows that now discharge at an average distance of 150 feet from water's edge must be evaluated on completion of the predictive modeling of the City of Toronto sewer system. The discharge of this combined and storm flow and its inevitable contaminant load can be extended beyond the swimming area by extension of each individual pipe, or by a collection header and one outfall, to a distance of approximately 120 metres, the limit of gravity discharge or to 500 metres by pumped discharge.

Another alternative with the collection header would be to carry the flow to the Main Treatment Plant for treatment or conveyance through the planned new outfall.

Two miles from shoreline swimming areas, the determination of the size of the new outfall will require consideration of and decision on the amount of C.S.O. and S.S.O. to be diverted to this outfall from the Harbour and Eastern Beaches. The potential impact of sewage effluent from the existing Main T.P. outfall is scheduled to be

eliminated by projects currently scheduled within the existing Metropolitan Toronto five-year Capital Works Programme.

The Sewer Separation Programme is proceeding on the basis that road storm drainage, which is estimated as 70 per cent. of the rainfall, is redirected immediately by reconnecting road catch basins from existing combined sewers to new storm sewers.

The remaining 30 per cent. is considered to be collected as roof drainage, which is frequently under previous or existing local By-law requirements conveyed via the sanitary system. No municipality requires roof storm drainage to be redirected to new storm sewers due to the substantial cost of making the underground reconnection, except possibly where a major redevelopment occurs. This 30 per cent. of storm drainage conceivably can be separated at perhaps less cost than road storm drainage by disconnecting roof drainage downpipes from the sanitary system to discharge above ground and then to the road storm sewer wherever possible. On a trial basis, funds have been allocated in the 1985 Waterfront Water Quality Improvement Programme to test the interest and acceptance of this method of separating roof storm drainage to reduce combined sewer outflow.

6.6 Sewage Treatment Improvements

In recent years the Metropolitan Capital Expenditure Targets have limited improvements to an annual average of \$40,000,000.00. For the years 1986 to 1989, the targets are \$37,500,000.00, \$43,634,000.00, \$46,539,000.00, \$44,627,000.00 respectively. Having regard for refuse disposal and water supply needs, water pollution control has received approximately \$30,000,000.00 of the total each year. These targets have remained constant with no inflation allowance. To meet these targets, Water Pollution Control improvements have been deferred, which could be accelerated now if additional funds are available.

Also, the Metropolitan 1985 "affordability study" reduced the previous targets by \$5,500,000.00 during 1986-88 from those noted above. Planned improvements, some directly affecting quality of effluent and, therefore, indirectly, recreational water quality, have been scheduled within these financial constraints.

In addition, the former Federal $16\frac{2}{3}$ per cent. contributions have been discontinued, as noted above. There have been some indications in 1985 that there may be a future shortfall in the Provincial 15 per cent. contribution, all of which delays achievement of planned improvements.

The proposed 1986 five-year Capital Works Programme is included at Appendix C.

As previously noted, the improvements and extension of the Main and Humber outfalls will have the most direct and immediate impact on waterfront water quality of any of the work in the Metropolitan Toronto Capital Works Programme.

The Metropolitan Capital Works Programme is based on extension and enhancement of secondary sewage treatment with tertiary phosphorus removal which has an approximate 96 per cent. efficiency. It does not envisage, with the 5 or 10-year range, any move to advanced waste water treatment such as was observed in the Committee's 1984 field inspection of South Lake Tahoe facilities. It was noted that the advanced process technology is unreliable, and excessively expensive in relation to benefits realized. Some of it was discontinued for these reasons. The increased costs are considered to be disproportionate to the incremental increase in effluent quality. The approach observed in San Francisco was to improve their inadequate secondary treatment capability and to intercept combined sewer flow and convey it together with treatment effluent to the ocean beyond the recreational areas. It would appear that their decision not to separate sewers was based on the availability of the ocean.

In addition to the Metropolitan Toronto Capital improvements mentioned above, there are two opportunities to change sewage treatment operation to reduce impact on the receiving water of Lake Ontario.

6.7 **Phosphorus Removal**

Phosphorus is conducive to algae growth, which is not only undesirable visually but part of the food chain for coliform growth.

The M.O.E.'s present phosphorus removal target of 1.0 can be increased to 0.9 or 0.8 p.p.m. It presently costs approximately \$1,500,000.00 per year to meet on average, the current 1.0 milligrams per litre (mg/l) target.

Our experience indicates that our existing plants can reduce the level to a 0.9 p.p.m. average at an additional annual cost of approximately \$100,000.00. This step could lead to further reduction if it is subsequently found to be economically viable.

6.8 **Effluent Chlorination**

The present chlorination period is from April to September inclusive, and is predicated on evidence that the cold water temperature beyond these dates kills coliform and virus and on the desire not to add chlorine to the environment unnecessarily.

The chlorination period and the chlorine residual target should be reviewed with data that would indicate the effect of any change in recreational water quality.

6.9 Animal and Bird Feces Control

The animal, seagull, and geese population make a significant contribution to the pollutant load which ultimately reaches the shoreline of Lake Ontario.

Nature has a process of attenuation of environmental pollutants on land that is effective, except where the pollutants are deposited in the swimming areas by rainfall or conveyed rapidly via paved surfaces and pipes to the swimming areas. The recent increased enforcement of "Stoop and Scoop" By-laws is helpful in controlling this source, particularly in the Eastern Beaches area.

The excessive number of seagulls and geese in the Western Beaches area is obvious. Various methods, including overhead monofilament lines and vertical landscaping, would be helpful in reducing the concentration of these pollutant sources in the critical swimming areas.

6.10 Storm Water Quality and Control

Due to the fact that storm water quantities may peak at 10 or 20 times the quantity of the dry weather sewage flow, it is not normally collected for treatment. Until such time as all other higher municipal priorities are attended to, treatment of storm water should not require consideration.

There are, however, methods of reducing some storm water contamination reaching Lake Ontario including:

- (1) reducing animal and bird contribution at source, as noted elsewhere;
- (2) ensuring catch basins traps function to full capacity, by observing adequate cleaning frequency; and
- (3) containment of "first wash" in detention tanks for controlled release to sewage treatment.

Detention tanks can be alternatives of supplements to sewer separation.

Studies are underway to establish how cost effective detention can be as a temporary or a permanent alternative to conventional sewer separation.

SECTION 7.0

EXECUTIVE SUMMARY BY WATERFRONT AREA

7.0 EXECUTIVE SUMMARY BY WATERFRONT AREA

7.1 Executive Summary Of Factors Affecting Waterfront Water Quality

The factors affecting water quality in the three major swimming areas can be summarized as follows:

Eastern Beaches

- (1) Combined Sewer Overflows at two locations, approximately 100 feet from shoreline.
- (2) Storm Sewer Outfall at ten locations approximately 100 feet from shoreline.
- (3) Animal and bird feces deposited in the immediate shoreline area or conveyed along with contaminants from vehicles and human activities via (1) and (2) above.
- (4) Reduced fresh water circulation due to the various combined sewer and storm sewer erosion protection structures.
- (5) Sewage treatment plant effluent under certain wind and current conditions.
- (6) Bottom sediments accumulating from above sources.

Harbour and Island Beaches

- (1) Combined Sewer Overflow at ten locations on the Harbour north perimeter area.
- (2) Storm sewer Outfall at seven locations on the Harbour north perimeter area.
- (3) Don River and its pollutant load from twenty-three combined sewer overflows, 38 storm sewer outfall and other sources.
- (4) Gull and Geese feces deposited on Island Spit land surfaces and near shore water areas.
- (5) Reduced circulation and fresh water on Island Beaches due to Spit.

Western Beaches

- (1) Combined Sewer Overflow at four locations.
- (2) Storm Sewer Outfall at three locations.
- (3) Humber River and its pollutant load from combined sewer overflow and storm sewer outfall and other sources.

- (4) Reduced circulation and fresh water due to the breakwater and obstruction of the openings.
- (5) Gull and Geese feces deposited on land and nearshore water areas.
- (6) Sewage treatment plant effluent under certain wind and current conditions.
- (7) Bottom sediments accumulating from Humber River.

7.2 Executive Summary Of Action Taken And Recommendations By Waterfront Area

Eastern Beaches

Work Completed

- (1) Woodbine Beach Shallows Improvements to shoreline configuration and circulation - by Metropolitan Toronto and Metropolitan Toronto and Region Conservation Authority.
- (2) Predictive Modelling Study - by Consulting Engineers (Gore & Storrie) for City of Toronto.
- (3) Sewer Systems Analysis - by Consulting Engineers (Dorsch) for City of Toronto.
- (4) Increased maintenance of beaches including removal of algae and conditions conducive to coliform life and multiplication - by the City of Toronto.
- (5) Various accelerated sewer separation projects scheduled in 1984 and 1985 to reduce combined sewer overflow to waterfront. (Refer to Table 2 and Schedules of the 1984 and 1985 Agreements)

Work in Progress

- (6) Lee-Leuty shallows improvements to shoreline configuration and circulation - by City of Toronto.
- (7) Demonstration of potential benefits and costs for chlorination and ultra violet disinfection of combined sewer overflow at MacLean Avenue - by City of Toronto.
- (8) Calibration of predictive model to evaluate potential impact of extension of storm outfalls and combined sewers from approximately 150 feet up to 500 feet or more from shoreline and to permit forecasting of the impact of storm events and actual duration of degraded water quality - by Consulting Engineers (Gore & Storrie) for City of Toronto.
- (9) Detection and correction of cross connections - by City of Toronto.
- (10) Extension and increased capacity of Main Treatment Plant outfall to disperse sewage treatment effluent and combined sewer overflow by - Metropolitan Toronto.
- (11) Various new sewer separation projects to reduce combined sewer overflow - by the City of Toronto.

- (12) Increase the sewage treatment phosphorus removal from a target 1.0 to of 0.9 p.p.m. - by Metropolitan Toronto.

Further Alternative Actions To Be Considered

- (13) Decide whether chlorination or ultra violet disinfection of various storm outfalls and combined sewer overflow will be substantially beneficial and cost effective and should be implemented on receipt of, and subject to the recommendations arising out of demonstration of item (7) above - by City of Toronto.
- (14) Decide whether the extension of some or all of the storm sewer outfalls and combined sewer overflows either individually or with a common header and single outfall is substantially beneficial and is cost effective on receipt of and subject to the recommendations arising out of study of Item (8) above - by City of Toronto.
- (15) Continue the increased maintenance of beaches initiated under the 1984-85 Waterfront Water Quality Programmes - by the City of Toronto.
- (16) Evaluate further increased sewage treatment phosphorus removal - by Metropolitan Toronto.

- (17) Evaluate costs and benefits of extension of the sewage treatment effluent chlorination period from the present April to September inclusive and increasing residual target benefits.
- (18) Improve quality of storm sewer effluent by means of improved "Stoop and Scoop" enforcement and a public information programme to obtain public co-operation in controlling animal and bird feces and fertilizers and unacceptable discharge to curbside and catchbasins and the storm sewer system.
- (19) Evaluate benefit and cost of increased street sweeping and catch basin maintenance to improve quality of storm sewer effluent.
- (20) Reduce the quantity of combined sewer overflow by redirecting some roof storm drainage to ground surface and thereby to the storm system.
- (21) Evaluate joint optimization of City of Toronto and Metropolitan Toronto sewer systems to accept additional combined sewer overflow and any part of the "first wash" of storm flow that can be accommodated either by treatment through the existing sewage treatment plant capacity or conveyed through the existing plant outfall.
- (22) Assess cost and benefits of providing increased new sewage treatment capacity or increased capacity in the new plant outfall

to treat or convey combined sewer overflow and storm sewer discharge diverted from recreational water areas.

- (23) Circulation improvements, including alteration or supplementing of existing erosion protection and outfall structures.

Harbour and Island Beaches

Work Completed

- (24) Various accelerated sewer separation projects in the Cities of Toronto and North York and the Borough of East York, scheduled for 1984 and 1985, to reduce combined sewer overflow to waterfront.

Work in Progress

- (25) Studies to review combined sewer separation programmes, including alternatives and to prioritize future projects in Toronto and East York by City of Toronto and by consulting Engineers for City of Toronto and the Borough of East York which affect the Don River and the Harbour, and thence the Island Beaches.
- (26) Various new sewer separation projects to reduce combined sewer overflow to the Don River and the Harbour - by the Borough of East York and City of Toronto.

- (27) Further detection and correction of cross connections - by the Cities of Toronto and North York and the Borough of East York.
- (28) Study and assessment of the existing City of Toronto and Metropolitan Toronto core area sewer systems confirm development capacity required, to identify capacity to optimize acceptance available of combined sewer overflow, evaluate flexibility and reliability, and assess the costs and potential benefits of inter-connection of existing system, a new core area interceptor sewer to reduce combined sewer overflow from reaching the beaches - by Consulting Engineers jointly for the City of Toronto and Metropolitan Toronto.
- (29) Study to produce a predictive model to be used to assess impact of each source of pollutant under various wind and current situations, and assess impact of physical changes to be made to improve water quality - By Consulting Engineers for City of Toronto.

Western Beaches

Work Completed

- (30) Various accelerated sewer separation projects in the City of Toronto and York to reduce combined sewer overflow to Humber River and Western Beaches - by City of Toronto.

- (31) Improvements to shoreline configuration and circulation - by City of Toronto.
- (32) Diversion of Humber River flow to reduce impact on recreational water area behind breakwall - by Metropolitan Toronto and Metropolitan Toronto and Region Conservation Authority.
- (33) Diversion of Grenadier Pond dry weather flow from Ellis Avenue Storm Sewer to the Humber River to reduce pollutant contributions to recreational water area outside and inside the breakwall.
- (34) Preliminary Study to determining pollutant loadings circulation patterns and assess impact of changing breakwater openings - by Consultants (Kleinfeldt) for City of Toronto.
- (35) Increased maintenance of beaches, including removal of algae and conditions conducive to coliform life and multiplication - by the City of Toronto,.
- (36) Detection and correction of cross connections - by Cities of Toronto, York and Etobicoke.

Work in Progress

- (37) Secondary Study to assess pollutant sources, variations of sources and impact with seasons and current changes - by Consultants (Kleinfeldt) for City of Toronto.
- (38) Various new sewer separation projects to reduce combined sewer overflow to Western Beaches by Cities of Toronto and York.
- (39) Study to produce a predictive model to be used to assess impact of each source of pollutant under various wind and current situations, and assess impact of physical changes to be made to improve water quality - by Consulting Engineers for City of Toronto.
- (40) Studies to review combined sewer separation programmes, including alternatives, and to prioritize future projects in Toronto and East York by City of Toronto and by Consulting Engineers for City of Toronto and the Borough of East York.
- (41) Extension and increased capacity of Humber treatment plant outfall to disperse effluent - by Metropolitan Toronto.

Further alternative actions to be considered

- (42) Circulation improvements including alteration or supplementing of existing erosion protection and outfall structures upon receipt of and subject to recommendations arising out of Items (33) and (36).

- (43) Decision on removal or overlay of existing Humber River sediment deposited behind breakwater upon receipt of and subject to recommendations arising out of Items (33) and (36) above.
- (44) Continue the increased maintenance of beaches initiated under the 1984-85 Waterfront Water Quality Programmes - by the City of Toronto.
- (45) Increase the sewage treatment phosphorus removal from a target 1.0 to 0.9 p.p.m. - by Metropolitan Toronto.
- (46) Evaluate costs and benefits of extension of the treatment effluent chlorination period from the present April to September inclusive, and increasing the chlorine residual targets.
- (47) Reduce geese and gull population and their fecal pollutant contribution via the storm sewer system and, in particular, directly on the breakwater and grassed areas of the Western Beaches.
- (48) Extension of Ellis Avenue storm sewer overflow to eliminate impact on water behind the breakwater and entering via breakwater openings.

Etobicoke Beaches

Work Completed

- (49) Increased maintenance of beaches, including removal of algae and conditions conducive to coliform life and multiplication.
- (50) Detection and correction of cross connections - by the City of Etobicoke.

Further Alternative Actions To Be Considered.

- (51) Study to identify and quantify sources of pollutants at various beaches, identify alternative actions and impact of each on water quality - by the City of Etobicoke.

Scarborough Beaches

Work Completed

- (52) Detection and correction of cross connections - by the City of Scarborough.

Work in Progress

- (53) Various new sewer separation projects to reduce combined sewer overflow - by the City of Scarborough.
- (54) Study to review the combined sewer separation programme, including alternatives, and to prioritize future projects in the City of Scarborough.

General

- (55) Review the existing recreational water quality guidelines of the Provincial Ministry of the Environment, currently applied by the Medical Officers of Health, considering alternative numbers and indicators other than fecal coliform, such as virus, sampling locations and procedures, and the real health impact of adopting the Federal Standard of 200 with a five-day mean or other guidelines, possibly based on a new epidemiological study.
- (56) Evaluate a programme to separate roof storm drainage to reduce combined sewer overflow discharge directly to watercourses and its impact on Lake Ontario waterfront discharge to the sewer system and the sewage treatment process.

- (57) Reduce geese and gull population across the waterfront and the fecal pollutant contribution from this source via the storm sewer system and directly to the waterfront beaches and breakwaters.
- (58) Evaluate provision of new self contained swimming areas, pools or lakes, to permit better control of water quality and temperatures to complement the Lake Ontario waterfront.
- (59) Continue the efforts put in place and accelerated by the various municipalities, agencies, T.A.W.M.S., Water Pollution Committee and the Provincial Ministry of the Environment to monitor and improve waterfront water quality.
- (60) To maintain accelerated sewer separation, Metropolitan Toronto should continue, for at least two more years, the sewer separation subsidy increase from 20 and 25 per cent. and 40 and 50 per cent. (depending on the design criteria for the eligible storm sewers).
- (61) The Water Pollution Committee and others should work to develop co-ordination between abutting Regions, sharing watersheds and Conservation authorities to facilitate co-operation and action to improve water quality in watercourses and the Lake Ontario shoreline which serve more than our Region and Authority.

(62) The Water Pollution Committee should continue to pursue the Government of Canada to re-establish a programme such as the discontinued Federal Grant Programme to assist municipalities to meet the Lake Ontario water quality objectives, which have in part been established by Federal participation in the International Joint Commission. This programme should be established on at least a five to ten-year basis, to assure some continuity of planning and action.

(63) The Water Pollution Committee should continue to work with the Province of Ontario to continue and to co-ordinate Provincial contributions for waterfront water quality improvements to supplement existing programme for M.T.C. storm sewer construction and M.O.E. regional grants for water pollution control. This programme should be established on at least five to ten-year basis to assure continuity of planning and action.

Comments:

Unfortunately, it is not possible or realistic to provide a complete, comprehensive, definitive programme of action at this time. The Metropolitan Toronto waterfront is in reasonably good condition for a large urban area. However, we are attempting to meet exceedingly difficult

standards which are made more difficult by a change in sampling procedures in 1983. Progress has been made in water pollution control commencing after World War II and since the formation of Metropolitan Toronto in 1953. There is no simple or singular solutions to improved water quality available at this time. Our continued and accelerated effort will bring about a gradual and incremental improvement.

The specific recommendations above are not necessarily intended for adoption or approval at this time, but to serve as an outline for future investigation and action.

SECTION 8.0
SUMMARY OF APPENDICES

8.00

LIST OF APPENDICES

- Appendix 'A' Executive Committee Report authorizing the Metropolitan Corporation to enter into an Agreement with the Ministry of the Environment respecting the 1984 Short Term Programme for Waterfront Water Quality Improvement.
- Appendix 'B' 1984 Agreement between the Metropolitan Corporation and the Ministry of the Environment.
- Appendix 'C' Proposed 1986-1990 Metropolitan Works Department Capital Works Programme - Water Pollution Control.
- Appendix 'D' Executive Committee Report authorizing the Metropolitan Corporation to enter into an agreement with the Ministry of the Environment respecting the 1985 Short Term Programme for Waterfront Water Quality Improvement.
- Appendix 'E' 1985 Agreement between the Metropolitan Corporation and the Ministry of the Environment.
- Appendix 'F' Press releases respecting pollution abatement efforts.

8.1

LIST OF TABLES

- Table 1 Funding Sources for 1984 Sewer Separation.
- Table 2 Schedule of Disbursements made under the 1984 Short Term Programme for Waterfront Water Quality Improvement
- Table 3 Funding Sources for 1985 Accelerated Sewer Separation.
- Table 4 Projected Requirements for Sewer Separation Construction 1986-1990.

8.2

LIST OF FIGURES

- Figure 1 Western Beaches Sampling Points
- Figure 2 Eastern Beaches Sampling Points
- Figure 3 Removal of Breakwater, Lee-Leuty Beach
- Figure 4 Sewage Treatment Plant Schematic
- Figure 5 City of Toronto Storm and Combined Overflows.

APPENDIX 'A'

WATERFRONT WATER QUALITY IMPROVEMENTS.

The Metropolitan Executive Committee recommends the adoption of the recommendation of the Water Pollution Committee contained in the following communication (March 1, 1984) from the Metropolitan Toronto Clerk:

The Water Pollution Committee on March 1, 1984, had before it the attached report (February 29, 1984) from the Commissioner of Works respecting the Short-Term Programme for Waterfront Water Quality Improvements; and recommending that, in order to ensure that the mechanism is in place to facilitate co-operation and efforts of the various levels of government to improve water quality, the Metropolitan Solicitor be authorized to prepare an agreement between Metropolitan Toronto and the Provincial Ministry of the Environment, containing terms satisfactory to the Metropolitan Solicitor, the Commissioner of Works, the Commissioner of Parks and Property, and the Minister of the Environment, to receive and process Provincial Ministry of the Environment contributions for any of the projects outlined in the Short-Term Programme, a copy of which is attached.

The Committee decided to recommend to the Executive Committee, and Council, the adoption of the aforementioned report.

(Report of the Commissioner of Works dated February 19, 1984.)

Short-term Programme (1984)
Waterfront Water Quality Improvement
Scheduling and Funding Sources

Further to the Short-Term Programme (1984) for Waterfront Water Quality Improvement received by the Water Pollution Committee at its November 10, 1983, meeting, the following schedule and sources of funding have been proposed for discussion with the Ministry of the Environment:

(1) Western Beaches:

The Ministry of the Environment (M.O.E.) should ensure that either the Ministry of Natural Resources or alternatively, the M.O.E. provides the provincial contributions that normally apply to waterfront development work by the Metropolitan Toronto Region and Conservation Authority (M.T.R.C.A.) for the following work:

	Gross Cost \$	Provincial Contribution \$
(a) Humber River Diversion by M.T.R.C.A.	150,000.00	82,500.00 (at 55 per cent.)
Subject to grant of easement by City of Toronto, work could commence in February, 1984.		
(b) Ellis Avenue Storm Sewer Extension*	1,500,000.00	825,000.00 (at 55 per cent.)
Subject to confirmation of the benefits to be achieved, and work could commence by September, 1984. A temporary diversion may be implementable by June, 1984.		

	Gross Cost \$	Provincial Contribution \$
(c) Physical shoreline improvements	500,000.00	275,000.00 (at 55 per cent.)
Including grass removal and substitution, geese and gull control, erosion protection, circulation improvement, and maintenance equipment which could commence in February, 1984.		
(d) Dredging*	250,000.00	137,500.00 (at 55 per cent.)
Subject to an Environmental Assessment Act exemption or class assessment and designation of a disposal area, and this work should commence in September, 1984.		

(2) Eastern Beaches:

The Ministry of the Environment should ensure that either the Ministry of Natural Resources or alternatively, the M.O.E. provides the provincial contributions that normally apply to waterfront development work by the Metropolitan Toronto Region and Conservation Authority (M.T.R.C.A.) for the following work:

(a) Study of impact of storm outfall, combined overflow discharge, and proposed improvements*	300,000.00	165,000.00 (at 55 per cent.)
(b) Various storm sewer outfall extensions by 130 metres*	9,600,000.00	5,280,000.00 (at 55 per cent.)
(c) Extensions of the McLean and Kenilworth Combined Sewer overflows by approximately 130 metres*	3,000,000.00	1,650,000.00 (at 55 per cent.)
(d) Physical shoreline improvements, including maintenance equipment	100,000.00	55,000.00 (at 55 per cent.)

These items could be undertaken by the City of Toronto or by the M.T.R.C.A. with the City of Toronto as the benefitting Municipality. Provincial funding is based on normal 55 per cent. share of M.T.R.C.A. waterfront development work. Alternatively these items could be considered eligible for M.T.C. subsidies based on 50 per cent. maximum contribution.

Report No. 7 of The Metropolitan Executive Committee.

	Gross Cost \$	Provincial Contribution \$
(3) Accelerated Sewer Separation Programme:		
The Ministry of the Environment (M.O.E.) should ensure that Ministry of Transportation and Communications (M.T.C.) or alternatively M.O.E. provides sufficient increased allocation for the subsidies for which the accelerated projects will be eligible.		
Accelerated sewer separation projects during the year 1984 made possible by increased local Metropolitan or Federal funding	9,194,000.00	2,397,500.00
(See attached Appendix A for details)		
Grand Totals (Items 1, 2, 3)	24,594,000.00	10,867,500.00

Appendix "A"

Short-term Programme (1984)
Waterfront Water Quality Improvement
Scheduling and Funding Sources

Accelerated Sewer Separation Programme Projects - 1984

	Gross Cost \$	Provincial Ministry of Transportation and Communications \$	Metropolitan Toronto at 50 per cent. of net \$
Borough of East York:			
1. Springdale Boulevard Local Sewers	430,000.00	215,000.00	107,500.00
2. Wiley/Donmore Trunk Storm Sewer	550,000.00	137,500.00	206,250.00
3. Pape Avenue Trunk Storm Sewer (Phase 1)	1,100,000.00	275,000.00	412,500.00

Report No. 7 of The Metropolitan Executive Committee.

	Gross Cost \$	Provincial Ministry of Transportation and Communications \$	Metropolitan Toronto at 50 per cent. of net \$
4. O'Connor/Woodbine Storm Outfall	<u>1,000,000.00*</u>	<u>250,000.00</u>	<u>375,000.00</u>
Accelerated Work Sub Totals (East York)	3,080,000.00*	877,500.00	1,101,250.00
Previously Scheduled Projects (East York) Total	2,185,000.00	853,000.00**	665,000.00
City of York:			
4. North Branch Trunk Storm Sewer, Arlington to Dufferin	<u>6,100,000.00*</u>	<u>1,800,000.00</u>	<u>1,800,000.00</u>
All Projects Sub Totals (York)	6,100,000.00*	1,800,000.00	1,800,000.00
Less allowance for previously scheduled Projects (York) Totals	<u>2,300,000.00</u>	<u>900,000.00</u>	<u>700,000.00</u>
Accelerated Projects Sub Totals (York)	3,800,000.00*	900,000.00	1,450,000.00
City of Toronto:			
6. Rosedale Valley Road Trunk Storm Sewer Sherbourne to Roxborough	2,098,000.00	512,000.00	793,000.00
7. Avenue Road Storm Sewer Macpherson to Chicora	<u>216,000.00</u>	<u>108,000.00</u>	<u>54,000.00</u>
Accelerated Work Sub Totals (City of Toronto)	2,314,000.00	620,000.00	847,000.00
Previously scheduled projects (City of Toronto) Totals	<u>10,000,000.00</u>	<u>4,550,000.00</u>	<u>450,000.00</u>

Report No. 7 of The Metropolitan Executive Committee.

	Gross Cost \$	Provincial Ministry of Transportation and Communications \$	Metropolitan Toronto at 50 per cent. of net \$
Grand Totals - Accelerated Projects	9,194,000.00	2,397,500.00	3,398,250.00
Grand Totals - Previously Scheduled Projects	14,485,000.00	6,305,000.00	1,815,000.00

- * Figure includes \$1,000,000.00 Federal Immediate Employment Stimulation Program
- ** Figure includes \$190,000.00 Ontario Neighbourhood Initiative Program

Note: The estimates above are for preliminary financial planning, and the proposed costs and subsidies are not committed at this time, and are subject to submission and approval of applications.

(A copy of the Short-Term Programme referred to in the foregoing communication from the Metropolitan Toronto Clerk has been forwarded to each Member of Council, and a copy thereof is also on file in the office of the Metropolitan Toronto Clerk.)

APPENDIX 'B'

1

THIS AGREEMENT made this 28th day of March, 1984.

BETWEEN:

THE MUNICIPALITY OF METROPOLITAN TORONTO,
hereinafter referred to as the "Metropolitan Corporation",
OF THE FIRST PART,

- and -

HER MAJESTY THE QUEEN in Right of Ontario as
represented by the Minister of the Environment,
hereinafter referred to as the "Ministry",

OF THE SECOND PART.

WHEREAS the Metropolitan Corporation, in co-operation with its Area Municipalities and The Metropolitan Toronto and Region Conservation Authority (the "Authority"), has undertaken a program for Waterfront Water Quality Improvement (the "Program"), consisting of shoreline improvements, a diversion structure for the mouth of the Humber River, studies for extension of sewer outfalls, and accelerated sewer separation projects, as described in Schedule "1" hereto attached; and

WHEREAS the Metropolitan Corporation, on behalf of its Area Municipalities and the Authority, has made application to the Ministry for grants to assist in carrying out the Program; and

WHEREAS the Ministry is concerned about water quality in the Toronto waterfront and believes that the Program will improve this water quality, and therefore wishes to assist the Metropolitan Corporation by providing grants to carry out the Program; and

WHEREAS the Metropolitan Council has, by its adoption of Clause No. 9 of Report No. 7 of its Executive Committee, on the 27th day of March, 1984, authorized the entering into of this Agreement;

NOW, THEREFORE, THIS INDENTURE WITNESSETH that, in consideration of the terms and conditions contained herein, the Metropolitan Corporation and the Ministry mutually covenant and agree as follows:

1. The Ministry will advance the sum of \$3,047,500.00 to the Metropolitan Corporation for the Provincial share of the costs of the Program, based on Schedule 1 - Program for Toronto Water Quality Improvement.

2. The Metropolitan Corporation will disburse such funds to the Area Municipalities and the Authority for the projects as they may be respectively entitled thereto and on the basis set out in Schedule I hereto, as amended from time to time by the Parties hereto by an exchange of correspondence. If actual costs for individual items vary from that shown in Schedule I, then the Provincial share shall be calculated on the basis of:

(a) For Sewer Separation projects - Ministry of Transportation and Communications Direction C1, dated 1978-12-01, regarding "Subsidy on Storm Sewer Construction";

(b) For all other projects - fifty per cent of gross costs, except for the Humber River Diversion Project which shall be 55% of gross cost provided that the total Provincial share of the costs of the Program shall not exceed the sum of \$3,047,500.00, or such additional amount as may be provided by the Ministry in its discretion.

3. The Metropolitan Corporation will provide its normal subsidy for eligible items of the Program without any reduction on account of Federal or Provincial assistance to the Program.

4. Any funds advanced to the Metropolitan Corporation which remain unspent by March 31, 1985, will be returned by the Metropolitan Corporation to the Treasurer of Ontario and Minister of Economics (the "Treasurer") by April 12, 1985. The Metropolitan Corporation will provide to the Ministry an audited statement certifying the disposition of funds under the Program, and will repay to the Treasurer any funds for which such statement is not provided to the Ministry by April 12, 1985. For purposes of this Clause, any monies retained as holdbacks by the Metropolitan Corporation, an Area Municipality or the Authority, under the provisions of the Construction Lien Act or a contract with respect to work done prior to April 1, 1985, shall be considered expended, and, so long as any such monies remain unpaid and not repaid to the Treasurer, the Metropolitan Corporation shall submit audited statements by the 15th day of April of each year following 1985, provided that, on the written request of the Ministry issued on or after March 1, 1986, the amount, if any, remaining unpaid and not repaid shall then be repaid to the Treasurer within 30 days.

5. This Agreement does not commit either Party to accept the results of the studies in the Program nor to fund any construction or dredging which may be

recommended as a result of the studies. Notwithstanding the above, the Parties may extend the Agreement, pursuant to Clause No. 7, to include these items.

6. The terms and conditions of the Agreement will be renegotiated if the Federal Government provides additional grants for any projects included in the Program, over and above those Federal funds already assigned to the Program.

7. The Agreement may be increased in amount or scope or extended in time by the Parties at any time up to March 31, 1985, or such later date as may be established pursuant to this Clause, prior to the expiry of such date as it may be adjusted pursuant to this Clause, and may be evidenced by an exchange of letters between the Chairman of the Metropolitan Corporation and the Minister of the Environment.

IN WITNESS WHEREOF the Minister of the Environment and The Municipality of Metropolitan Toronto have duly executed this Agreement.

SIGNED, SEALED AND DELIVERED)

Authorized by Report No. 7(9)
of the Executive Committee adopted
in Council on the 27th day of
March, 1984

METROPOLITAN CLERK

THE MUNICIPALITY OF
METROPOLITAN TORONTO

Metropolitan Clerk

Treasurer

HER MAJESTY THE QUEEN
in Right of Ontario as represented
by the Minister of the Environment

Schedule 1
PROGRAM FOR METROPOLITAN TORONTO WATERFRONT WATER QUALITY IMPROVEMENT
SCHEDULE OF COSTS AND PROVINCIAL FUNDING

	<u>Gross Cost</u>	<u>Provincial Contribution</u>
1. <u>Western Beaches</u>		
(a) Humber River Diversion		
(b) Shoreline Improvements, including grass and sediment removal and substitution, animal and bird control measures, sewer diversions, erosion protection, circulation improvement, and maintenance equipment and a study of the feasibility of dredging	\$ 900,000.00	\$ 450,000.00
2. <u>Eastern Beaches</u>		
(a) Studies of Impact of Storm and Combined Sewer System and Outfall Extensions		
(b) Shoreline Improvements as in 1(b), including maintenance equipment	\$ 400,000.00	\$ 200,000.00
3. <u>Other Work</u>		
Studies, physical improvements, equipment, etc., at other locations subject to approval of Metropolitan Toronto and Province of Ontario		
4. <u>Accelerated Sewer Separation</u>		
(a) Borough of East York		
- Springdale Boulevard Local Storm Sewers	\$ 430,000.00	\$ 215,000.00
- Wiley/Danmore Trunk Storm Sewer	\$ 350,000.00	\$ 175,000.00
- Pape Avenue Trunk Storm Sewer (Phase 1)	\$ 1,100,000.00	\$ 550,000.00
- O'Connor/Woodbine Storm Outfall	\$ 1,000,000.00	\$ 500,000.00
(b) City of York		
North Branch Trunk Storm Sewer, Arlington to Dufferin (portion of cost not previously scheduled)	\$ 3,800,000.00	\$ 1,900,000.00
(c) City of Toronto		
- Rosedale Valley Road Trunk Storm Sewer, Sherbourne to Roxborough	\$ 2,098,000.00	\$ 1,049,000.00
- Avenue Road Storm Sewer, Macpherson to Chicora	\$ 216,000.00	\$ 108,000.00
TOTAL	\$10,494,000.00	\$3,047,500.00

Note: All of the above amounts are preliminary estimates only and

APPENDIX 'C'

September 27, 1985

CAPITAL WORKS PROGRAMME
METROPOLITAN CORPORATION - WATER POLLUTION CONTROL
(1,000's of Dollars)

Description of Project	Gross Est. Cost	Approved by O.M.B.	To Dec. 31/85	Estimated Expenditure (Gross)						Total 1986-1990 Incl.	Balance to Completion
				1986	1987	1988	1989	1990	1990		
SUMMARY				\$	\$	\$	\$	\$	\$	\$	\$
WORKS IN PROGRESS	761,372	911,818	332,734	27,488	38,143	46,802	44,157	26,913	183,505	226,143	
LESS: ESTIMATED SUBSIDY UNDER FORGIVENESS CLAUSE OF GOVERNMENT OF CANADA AGREEMENT AND SUCCESSOR (1/3 OF 2/3 OF ELIGIBLE ITEMS 1,2,3,4,5).	38,927		38,927								
WINTER WORKS SUBSIDY (MILE-1970) (ITEM 2)	184		184								
LOCAL INITIATIVE PROGRAMME SUBSIDY (ITEM 6)	11		11								
GRANTS - POLLUTION ABATEMENT INCENTIVE ACT ITEMS 1,2,4)	70		70								
WATER & SEWERAGE GRANTS (PROVINCIAL) ITEMS (1,2,3,4,5,6,8)	100,929		41,934	3,732	5,450	6,834	6,440	3,866	26,222	32,843	
MOE COST SHARING (ITEM 3)	9		9								
NET EXPENDITURE	601,242	911,818	231,999	23,756	32,693	39,968	37,717	23,049	157,183	193,300	

METROPOLITAN CORPORATION - WATER POLLUTION CONTROL
(1,000's of Dollars)

Item No. 1983 1986	Description of Project	Priority Rank- ing by Dept.	Gross Est. Cost \$	Approved by O.M.B. \$	To Dec.31/83 \$	Estimated Expenditures (Gross)						Total 1986-1990 Incl. \$	Balance to Completion \$	Remarks O.M.B. Application	
						1986	1987	1988	1989	1990					
						\$	\$	\$	\$	\$					
Treatment Plants															
1 1	Highland Creek Plant Stage III	8	46,751	47,280	46,741	10						10			
2 2	Humber Plant	2	120,858	71,850	54,972	5,866	1,747	3,575	9,780	11,151	32,119	33,767			
3 3	Main Plant	1	406,667	197,250	153,009	16,012	27,365	27,901	20,042	14,163	105,483	148,175			
4 4	Highland Creek Plant Stage IV	3	75,308	26,500	18,494	2,625	6,592	5,838	4,290	460	19,805	37,009			
5 5	North Toronto Plant	4	1,292	3,000	962	230	100				330				
6 6	Sanitary Trunk Sewers Mid-Toronto Interceptor	6	41,751	33,670	32,893	90	525	4,935	3,308	0	8,858				
Miscellaneous															
7 7	Sewer Separation Subsidy	5	40,000	30,791	24,777	2,605	1,814	1,246	1,225	1,141	8,031	7,192			
Sewer System, extensions and Improvements															
8 8		7	9,755	1,477	886	50	0	3,307	5,512	0	8,869	0			
			741,372	411,818	332,734	27,488	38,143	46,802	44,157	26,915	183,505	226,143			

APPENDIX 'D'

6

**PROPOSED SHORT TERM PROGRAMME (1985) FOR
WATERFRONT WATER QUALITY IMPROVEMENT.**

The Metropolitan Executive Committee recommends the adoption of the recommendation of the Water Pollution Committee contained in the following communication (May 2, 1985) from the Metropolitan Toronto Clerk:

The Water Pollution Committee at its meeting held on May 2, 1985, had before it the following correspondence, copies of which are attached:

- (1) a report dated April 26, 1985, from the Commissioner of Works advising that discussions have been held with the appropriate local municipalities on the scope, estimated costs and shared funding basis proposed by the Ministry of the Environment for alternative supplementary projects; that the local municipalities are prepared to recommend to their respective Councils inclusion of some of the alternative projects, as outlined in this report, in the 1985 Short Term Programme for Waterfront Water Quality Improvement; and recommending that the Metropolitan Solicitor be authorized to execute an agreement between Metropolitan Toronto and the Provincial Ministry of the Environment, containing terms and conditions satisfactory to the Metropolitan Solicitor, the Commissioner of Parks and Property, the Commissioner of Works and the Minister of the Environment, to receive and disburse Provincial Ministry of the Environment contributions for any of the

Report No. 15 of The Metropolitan Executive Committee.

waterfront water quality improvement projects generally described above and including provision for subsequent contributions for sewer separation projects, should they become available;

- (2) a copy of a communication dated May 2, 1985, addressed to the Commissioners of Works of each of the Area Municipalities from the Metropolitan Deputy Commissioner of Works, advising that, as announced by the Honourable Morley Kells, Minister of the Environment, approximately \$3.7 million in special contributions will be made in their 1985 fiscal year (March 31, 1985, to March 31, 1986) to local municipalities through Metropolitan Toronto under the 1985 Short Term Programme for Waterfront Water Quality Improvement for physical improvements on the waterfront and sewer separation projects, and that additional funds apply to other programs and regional grants to be received by Metropolitan Toronto for sewage treatment projects; and
- (3) a copy of a press release dated April 29, 1985, in which the Honourable Morley Kells, Minister of the Environment, announced that the Province of Ontario will spend \$9.7 million in their 1985 fiscal year to clean up beach pollution in the Metropolitan Toronto area.

The Water Pollution Committee decided to recommend to the Metropolitan Executive Committee, and Council, the adoption of the aforementioned report from the Commissioner of Works.

(Report of the Commissioner of Works dated April 26, 1985.)

At the meeting of April 4, 1985, the Water Pollution Committee approved a report advising of the Ministry of Environment's (MOE) acceptance of part of our proposed 1985 Programme, and their proposed alternative supplementary projects, and containing the following recommendations in connection therewith:

- (1) that we be authorized to analyze and review the scope, costs and shared funding, proposed for alternate projects by the Provincial Ministry of the Environment, with the local municipalities which may become the initiating agencies paying the non-provincial share of the cost; and
- (2) that, subject to the approval of the local municipalities involved, we report further on the possible inclusion of any of the alternative M.O.E. projects in our Short Term Programme (1985) for Waterfront Water Quality Improvement.

Essentially, the MOE, in response to our proposed programme, have indicated they will only be approving physical work and studies directly affecting the waterfront and will not be approving the contributions we requested on behalf of our local municipalities to make up the \$2.5 million shortfall in the Ministry of Transportation and Communications (MTC) subsidy for sewer construction. They have also indicated that there would be a shortfall of approximately \$4.9 million in their Regional Grants due Metropolitan Toronto for work under its 1985 Capital Works Programme.

Report No. 15 of The Metropolitan Executive Committee.

In accordance with the recommendations of the aforementioned report, we have discussed the scope, estimated costs and shared funding basis proposed by the Ministry for the alternative projects with the appropriate local municipalities. The local municipalities advise they are prepared to recommend to their respective Councils inclusion of some of the alternative projects, as listed below in Classification A2, B, and D in the Short Term Programme (1985) for Waterfront Water Quality Improvement.

Project Classification A1 - 50% MOE/50% local municipality (Projects originally proposed by local municipalities)

Project Description	Gross Cost \$	M.O.E. Share \$	Local Share \$	Initia- ting Municipality
Western Beaches				
Physical Shoreline Clean-up	125,000	62,500	62,500	Toronto
Circulation Improvements	25,000	12,500	12,500	Toronto
Shoreline Modifications and Protection	95,000	47,500	47,500	Toronto
Eastern Beaches				
Physical Shoreline Clean-up	25,000	12,500	12,500	Toronto
Predictive Model	104,000	52,000	52,000	Toronto
Lee-leuty Improvement	150,000	75,000	75,000	Toronto
Joint Pilot Study on Chlorination and Ultra-violet treatment for combined sewer overflow (McLean Ave)	50,000	25,000	25,000	MOE Toronto
Shoreline Modifications and Protection	<u>25,000</u>	<u>12,500</u>	<u>12,500</u>	Toronto
	599,000	299,500	299,500	

Project Classification A2
25 Per Cent. M.O.E./
75 Per Cent. Local Municipalities
(Projects proposed by local municipalities)

Project Description	Gross Cost \$	M.O.E. Share \$	Local Share \$	Initia- ting Municipi- pality
Outfall Monitoring				
Western Beaches (including Humber River)	50,000	12,500	37,500	Toronto* Etobicoke York North York
Eastern Beaches (including Don River and Massey Creek)	50,000	12,500	37,500	Toronto* Scarborough East York North York
	<u>100,000</u>	<u>25,000</u>	<u>75,000</u>	

* The distribution of the estimated gross cost among the local municipalities is yet to be determined.

Project Classification B
60 Per Cent. M.O.E./
40 Per Cent. Local
(Projects proposed by MOE)

Project Description	Gross Cost \$	M.O.E. Share \$	Local Share \$	Initia- ting Municipi- pality
Storm Sewer Modelling (Possibly deferred to 1986)				
Combined Sewer Modelling and Overflow Controls				
City of Toronto	220,000	132,000	88,000	
Scarborough	170,000	102,000	68,000	Scarborough
East York	<u>130,000</u>	<u>78,000</u>	<u>52,000</u>	East York
	520,000	312,000	208,000	

Report No. 15 of The Metropolitan Executive Committee.

Project Classification D
50 Per Cent. M.O.E./
50 Per Cent. Local
(Projects proposed by MOE)

Project Description	Gross Cost \$	M.O.E. Share \$	Local Share \$	Initiating Municipality
Beaches Modelling				
Western Beaches	70,000	35,000	35,000	Toronto Etobicoke
	70,000	35,000	35,000	
Total Estimated Costs for Waterfront Projects	1,289,000	671,500	617,500	

Project Classification E
Accelerated Sewer Separation Projects
Up to 50 Per Cent. (Gross) MOE/
Up to 50 Per Cent. (Net) Metro

Estimated Cost for Accelerated Sewer Separation Projects	8,600,000	2,500,000	700,000 (Local)	**
		** 2,500,000 (Federal)	2,900,000 (Metro)	
Grand Total	9,889,000 (MOE)	3,171,500 (Local) 2,500,000 (Federal)	1,317,500 2,900,000 (Metro)	

** If Federal contributions shown at \$2,500,000 are not forthcoming, the local municipalities share then will increase.

Discussions are continuing with the Province to attempt to resolve the amount of contributions that may ultimately be available. These discussions involve both the possible MOE contribution to make up the predicted \$2.5 million shortfall in MTC subsidy for sewer construction reported by our local municipalities, and the shortfall of \$4.9 million in Regional Grants for which Metropolitan Toronto is eligible and anticipated receipt of in approving our 1985 Capital Works Programme.

Report No. 15 of The Metropolitan Executive Committee.

It should be noted that the gross cost estimates for the proposed projects are the most recent available from the initiating local municipalities and the MOE and are not yet final. They are shown herein for planning purposes and to permit the proposed agreement to be completed with the Province as early as possible, in order that the studies will be representative of summer conditions and the improvements impact during the summer of 1985. The work detail and final approved gross cost will be determined when each initiating municipality authorizes the project to proceed and approves its share of the cost.

One course of action at this time would be to take no action on the proposed 1985 Water Quality Improvement Programme until the MOE's intentions are known with respect to their contribution to make up the shortfall in the MTC subsidy for sewer construction by our local municipalities, and to the Regional Grant shortfall that affects the Metropolitan Toronto Capital Works Programme.

However, to assure that there is no delay in commencing work at the earliest opportunity, it would be desirable to proceed now to enter into a 1985 agreement with the Province similar to the 1984 agreement, to provide for Metropolitan Toronto disbursement of MOE's contributions to local municipalities for those projects which are accepted, and to include provision for Sewer Separation projects in the event that the MOE's subsequent contributions make up the MTC's shortfall.

Recommendation:

That the Metropolitan Solicitor be authorized to execute an agreement between Metropolitan Toronto and the Provincial Ministry of the Environment, containing terms and conditions satisfactory to the Metropolitan Solicitor, the Commissioner of Parks and Property, the Commissioner of Works and the Minister of the Environment, to receive and disburse Provincial Ministry of the Environment contributions for any of the waterfront water quality improvement projects generally described above and including provision for subsequent contributions for sewer separation projects, should they become available.

(A copy of the communication dated May 2, 1985, addressed to the Commission of Works of each Area Municipality, and a copy of the Press Release, referred to above, have been forwarded to each Member of Council, and copies thereof are also on file in the office of the Metropolitan Toronto Clerk.)

7

**APPOINTMENT OF
COMMISSIONER OF MANAGEMENT SERVICES.**

The Metropolitan Executive Committee recommends the adoption of the following report (May 1, 1985) from the Commissioner of Personnel and certifies to Council a special estimate in the amount of \$25,000.00 to give effect thereto:

Management Sub-Committee on April 30, 1985, considered the applications for the position of Commissioner of Management Services. After due deliberation,

APPENDIX 'E'

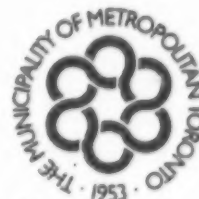
COPY For the information of The Metropolitan Commissioner of Works

The Municipality of
Metropolitan Toronto

Metropolitan Legal Department

City Hall, West Tower, 13th Floor
Toronto, Ontario, Canada M5H 2N1
Telephone: (416) 367-

L 3-341.1



June 23, 1985

THE METROPOLITAN COMMISSIONER OF FINANCE:

**Re: Proposed Short Term Programme (1985) for
Waterfront Water Quality Improvement
E.C.R. 15(6) - May 14, 1985**

Enclosed, for your information and for safekeeping, is a fully
executed copy of the Agreement dated June 5, 1985, between the
Metropolitan Corporation and the Minister of the Environment, in the subject
matter.



J. T. Kirkland

JTK:eg

Encl

cc with encls: ✓ The Metropolitan Commissioner of Works

The Metropolitan Auditor

BETWEEN:

- and -

hereinafter referred to as the "Ministry".

OF THE SECOND PART.

WHEREAS the Metropolitan Corporation, in co-operation with its Area Municipalities and The Metropolitan Toronto and Region Conservation Authority (the "Authority"), has undertaken a program for Waterfront Water Quality Improvement (the "Program"), consisting of sewer separations, improvements to the Humber, Highland Creek and Main Sewage Treatment Plants, studies and research into beach pollution, clean up of eastern and western beaches, modelling and studies of beaches, breakwaters, and disinfection of sewer outfall discharges, as described in Schedules 1, 2, 3, 4 and 5 hereto attached; and

WHEREAS the Metropolitan Corporation, on behalf of its Area Municipalities and the Authority, has made application to the Ministry for grants to assist in carrying out the Programs and

WHEREAS the Ministry is concerned about water quality in the Toronto waterfront and believes that the Program will improve this water quality; and therefore wishes to assist the Metropolitan Corporation by providing grants to carry out the Program; and

WHEREAS the Metropolitan Council has, by its adoption of Clause No. 4 of Report No. 15 of its Executive Committee, on the 14th day of May, 1983, authorized the entering into of this Agreement;

NOW, THEREFORE, THIS INDENTURE WITNESSETH that, in consideration of the terms and conditions contained herein, the Metropolitan Corporation and the Ministry mutually covenant and agree as follows:

1. The Ministry will advance the sum of \$1,700,000.00 to the

APPROVED AS TO FORM

NEWINGTON HALL, NEWINGTON

Metropolitan Corporation for the Provincial share of the costs of the Program, based on Schedules 1, 2, 3, 4 and 5 hereto attached.

2. The Ministry's obligation to advance funds hereunder is subject to sufficient monies being provided by the Legislature and allocated for the purpose.

3. The Metropolitan Corporation will disburse such funds to the Area Municipalities and the Authority for the projects as they may be respectively entitled thereto and on the basis set out in the Schedules attached hereto, as amended from time to time by the Parties hereto by an exchange of correspondence. If actual costs for individual items vary from that shown in the said Schedules, then the Provincial share shall be calculated on the basis of:

- (a) For Sewer Separation projects - Ministry of Transportation and Communications Direction C1, dated 1973-12-31, regarding "Subsidy on Storm Sewer Construction" or any other basis as agreed by the two Parties except that Federal contributions shall not be deducted from gross costs and the Provincial contributions may be applied to other eligible projects;
- (b) For Projects Classifications A1 and D - fifty per cent. of gross costs;
- (c) For Project Classification A2 - twenty-five per cent. of gross costs;
- (d) For Project Classification B - sixty per cent. of gross costs;

provided that the total Provincial share of the costs of the Program shall not exceed the sum of \$3,700,000.00, or such additional amount as may be provided by the Ministry in its discretion.

4. The Metropolitan Corporation will provide its normal subsidy for eligible items of the Program without any reduction on account of Federal or Provincial assistance to the Program.

5. Unless the Ministry has confirmed in writing that a particular project listed in a Schedule or an amendment to a Schedule may proceed pursuant to this

Agreement, no monies advanced pursuant to this Agreement shall be applied to such project, and such confirmation may require that the monies advanced hereunder only be expended for specified costs or types of costs with respect to the project.

6. Copies of all draft reports and final reports prepared for purposes relating to this Agreement shall be provided to the Ministry when received by the proponent.

7. Any funds advanced to the Metropolitan Corporation which remain unspent by March 31, 1986, will be returned by the Metropolitan Corporation to the Treasurer of Ontario and Minister of Economics (the "Treasurer") by May 31, 1986. The Metropolitan Corporation will provide to the Ministry an audited statement certifying the disposition of funds under the Program, and will repay to the Treasurer any funds for which such statement is not provided to the Ministry by May 31, 1986. For purposes of this Clause, any monies advanced to local municipalities or retained as holdbacks by the Metropolitan Corporation, an Area Municipality or the Authority, under the provisions of the Construction Lien Act or a contract with respect to work done prior to April 1, 1986, shall be considered spent, and, so long as any such monies remain unpaid and not repaid to the Treasurer, the Metropolitan Corporation shall submit audited statements by the 31st day of May of each year following 1986, provided that, on the written request of the Ministry issued on or after March 1, 1987, the amount, if any, remaining unpaid and not repaid shall then be repaid to the Treasurer within 30 days.

8. This Agreement does not commit either Party to accept the results of the studies in the Program nor to fund any construction or dredging which may be recommended as a result of the studies. Notwithstanding the above, the Parties may extend the Agreement, pursuant to Clause No. 7, to include these items.

9. The terms and conditions of the Agreement will be renegotiated if the Federal Government provides additional grants for any projects included in the Program, over and above those Federal funds already assigned to the Program.

10. The Agreement may be increased in amount or scope or extended in time by the Parties at any time prior to March 31, 1986, or such later date as may be established pursuant to this Clause, prior to the expiry of such date as it may be

adjusted pursuant to this Clause, and may be evidenced by an exchange of letters between the Chairman of the Metropolitan Corporation and the Minister of the Environment.

IN WITNESS WHEREOF the Minister of the Environment and The Municipality of Metropolitan Toronto have duly executed this Agreement.

SIGNED, SEALED AND DELIVERED) THE MUNICIPALITY OF
METROPOLITAN TORONTO

Authorized by Report No 15(C)
of the Executive Committee adopted

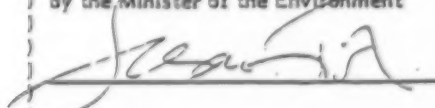
in Council on the 14 day of
May 1985


METROPOLITAN CLERK


Metropolitan Clerk


Treasurer

HER MAJESTY THE QUEEN
in Right of Ontario as represented
by the Minister of the Environment



SCHEDULE A

1985 SHORT TERM PROGRAMME FOR WATERFRONT WATER QUALITY IMPROVEMENT

PROJECT CLASSIFICATION A1 50% MDE/50% Local Municipality

PROJECT DESCRIPTION	ORIGINALLY ESTIMATED GROSS COST	ORIGINALLY ESTIMATED M.D.E. SHARE	PROJECT RESERVATION CONFIRMED	CURRENT GROSS COST	CURRENT M.D.E. SHARE	CURRENT LOCAL SHARE	PROGRESS PAYMENTS TO BE DETERMINED
WESTERN BEACHES							
Physical Shoreline Clean-up	125,000	42,500	Toronto	125,000	42,500	42,500	
Circulation Improvements (1)		0	0		0	0	
Shoreline Modifications & Protection		0	0		0	0	
EASTERN BEACHES							
Physical Shoreline Clean-up	25,000	12,500	Toronto	25,000	12,500	12,500	
Storm & Combined Outfall Predictive Model (2)	105,000	54,500	Toronto	105,000	54,500	54,500	
Lee-louly Improvement	178,000	89,000	Toronto	178,000	89,000	89,000	
Joint Pilot Study on Chlorination & Ultra-violet treatment	50,000	25,000	Toronto	50,000	25,000	25,000	
Shoreline Modifications & Protection		0	0		0	0	
Subsidy Programme for Removal of Cross Connections on Private Property (3)	125,000	42,500		125,000	42,500	42,500	
TOTALS	412,000	306,000		412,000	306,000	306,000	

(1) To be determined in connection with class B project Beaches Modelling - Western Beaches

(2) Collection of data & development & calibration of a model to assess the impact of retention of storm & combined sewer outfalls

(3) Shared cost programme (25% MDE, 25% local municipality), on approval of application from private owner (paying 50%) to repair or relocate sanitary cross connections now improperly connected to storm sewers or to remove storm drainage connections to combined sewer system. Gross cost shown for this item is the net municipal cost of which the MDE share is 50%.

SCHEDULE 2

1985 SHORT TERM PROGRAMME FOR WATERBOMT WATER QUALITY IMPROVEMENT

PROJECT CLASSIFICATION A2 231 HDE/753 Local Municipality

PROJECT DESCRIPTION	ORIGINALLY ESTIMATED COST	ORIGINALLY ESTIMATED M.O.E. SHARE	LOCAL PROJECT INITIATION CONFIRMED	CURRENT GROSS COST	CURRENT M.O.E. SHARE	CURRENT LOCAL SHARE	PROGRESS PAYMENTS TO BE DETERMINED
STORM & COMBINED SEWER OUTFALL MONITORING & INVESTIGATIONS (1)							
Western Beaches (including Nuuksu River)							
-Toronto	5,500	1,375	4,125	Toronto	5,500	1,375	4,125
-Etobicoke	30,000	7,500	22,500	Etobicoke	30,000	7,500	22,500
-York	20,000	5,000	15,000	York	20,000	5,000	15,000
-North York	50,000	12,500	37,500	North York	50,000	12,500	37,500
	105,500	26,375	79,125		105,500	26,375	79,125
Eastern Beaches (including Don River and Humber Creek)							
-Toronto	5,500	1,375	4,125	Toronto	5,500	1,375	4,125
-Scarborough	100,000	25,000	75,000	Scarborough	100,000	25,000	75,000
-East York	20,000	5,000	15,000	East York	20,000	5,000	15,000
-North York	50,000	12,500	37,500	North York	50,000	12,500	37,500
	175,500	43,875	131,625		175,500	43,875	131,625
TOTALS	281,000	70,250	210,750		281,000	70,250	210,750

(1) Patrol of outfalls, flow sampling, laboratory testing, investigation of cross connections, dye testing etc.

SCHEDULE 3

1985 SHORT TERM PROGRAMME FOR WATERFRONT WATER QUALITY IMPROVEMENT

PROJECT CLASSIFICATION B 482 NDE/403 Local Municipality

PROJECT DESCRIPTION	ORIGINALLY ESTIMATED GROSS COST		ORIGINALY ESTIMATED M.O.E. SHARE		LOCAL SHARE		PROJECT INITIATOR		RESERVATION CONFIRMED		CURRENT GROSS COST		CURRENT M.O.E. SHARE		CURRENT LOCAL SHARE		PROGRESS PAYMENTS TO BE DETERMINE
STORM SEWER MODELLING (1)		0		0	0	0											
COMBINED SEWER MODELLING & OVERFLOW CONTROLS																	
-Toronto	220,000		132,000		98,000		Toronto				220,000		132,000		98,000		
-Scarborough	170,000		102,000		68,000		Scarborough				170,000		102,000		68,000		
-East York	130,000		78,000		52,000		East York				130,000		78,000		52,000		
-York	50,000		30,000		20,000		York				50,000		30,000		20,000		
	570,000		342,000		228,000						570,000		342,000		228,000		
TOTALS	570,000		342,000		228,000						570,000		342,000		228,000		

(1) Deferred to 1986

25-Sep-85

SCHEDULE 4

1985 SHORT TERM PROGRAMME FOR WATERFRONT WATER QUALITY IMPROVEMENT

PROJECT CLASSIFICATION B 502 NOE/501 Local Municipality

PROJECT DESCRIPTION	ORIGINALLY ESTIMATED GROSS COST	ORIGINALLY ESTIMATED M.O.E. SHARE	LOCAL SHARE	PROJECT INITIATOR	RESERVATION CONFIRMED	CURRENT GROSS COST	CURRENT M.O.E. SHARE	CURRENT LOCAL SHARE	PROGRESS PAYMENTS TO BE DETERMINED
BEACHES DATA DEVELOPMENT & MODELLING									
WESTERN BEACHES									
Investigations of near shore current patterns, including water sampling, pollutant-graphs, dye testing & tracking plans	92,000	44,000	44,000	Toronto		92,000	44,000	44,000	
Measurement of non-point sources (sewer & gullies) of local contamination & development of recommendations for control	27,500	13,750	13,750	Metra		27,500	13,750	13,750	
Monitoring of impact of 1984 Humber River diversion & behaviour of Humber River with respect to break water	26,000	13,000	13,000	Metra		26,000	13,000	13,000	
OPTIMIZATION OF SANITARY SEWER SYSTEM									
Study of potential optimization & real time control to retain initial rainfall surface drainage & contaminants	10,000	5,000	5,000	Metra		10,000	5,000	5,000	
EASTERN BEACHES									
BEACH IMPROVEMENT PLAN									
	155,500	77,750	77,750			155,500	77,750	77,750	
TOTAL IDENTIFIED PROJECTS - amounts allocated									
	1,618,500	794,000	822,500			1,618,500	794,000	822,500	
Contingency									
	8,000	4,000	4,000			8,000	4,000	4,000	
GRAND TOTAL									
	1,626,500	800,000	826,500			1,626,500	800,000	826,500	

SCHEDULE 3
1983 SHORT TERM PROGRAMME FOR WATERFRONT WATER QUALITY IMPROVEMENT
Accelerated Sewer Separation Projects

CITY OF YORK PROJECT DESCRIPTION	GROSS PROJECT COST	FEDERAL FUNDING	PROVINCIAL ELIGIBILITY FOR STORM SEWER CONST'N (2)	PROVINCIAL ELIGIBILITY FOR STORM SEWER CONST'N (AMOUNT)	O.M.I.P. PROGRAMME FUNDING	M.T.R.O. ROADS FUNDING	M.T.C. SHARE	M.O.E. SHARE	M.T.R.O. MOBILE SUBSIDY	YORK SHARE	
Hopeville Ave	110,000		50	55,000			55,000		50	27,500	27,500
Beaulieu Ave	234,000		45	105,000			105,000		50	44,500	44,500
Castlefield Ave	245,000		45	110,000			110,000		50	47,500	47,500
Ridelle Ave	92,000		50	46,000			46,000		50	23,000	23,000
Vaughan Rd	46,000		50	23,000			23,000		50	11,500	11,500
Ewert Ave	49,000		50	34,500			34,500		50	17,250	17,250
Scarlett Rd Trunk Storm Sewer	1,600,000		21	334,000			334,000		50	832,000	832,000
Ypres Rd	192,000		40	76,800			76,800		50	37,400	37,400
Kane Ave & Eglington Ave	195,000		45	87,000			87,000	87,000	50	54,000	54,000
Bessie Ave	300,000		40	120,000			120,000	120,000	50	90,000	90,000
Leahon Ave & Brownville Ave	92,000		50	46,000			46,000	46,000	50	23,000	23,000
Trowell Ave	260,000		50	100,000			100,000	100,000	50	80,000	80,000
Keble St	135,000		40	54,000			54,000	54,000	50	40,500	40,500
Scott Rd (Ypres to Eglington)	110,000		45	49,000			49,000	49,000	50	30,500	30,500
Eglington Ave	45,000		50	32,500			32,500	32,500	50	16,250	16,250
Scott Rd (Donald to Ypres)	81,000		50	40,500			40,500	40,500	50	20,250	20,250
Caesars Ave	160,000		44	70,000			70,000	70,000	50	45,000	45,000
Lacey Ave & Silverthorn Ave	220,000		40	88,000			88,000	88,000	50	44,000	44,000
Richwell Ave	100,000		45	45,000			45,000	45,000	50	27,500	27,500
Juliet Cres & Westbury Cres	190,000		40	76,000			76,000	76,000	50	37,000	37,000
Ellis Ave	139,000		40	55,400			55,400	55,400	50	41,700	41,700
TOTALS	6,435,000	0		1,449,900	0	0	786,300	862,400		1,492,550	1,492,550

As per letter dated April 11, 1983

25-Sep-83

SCHEDULE 3
1985 SHORT TERM PROGRAMME FOR WATERFRONT WATER QUALITY IMPROVEMENT
Accelerated Sewer Separation Projects

CITY OF TORONTO PROJECT DESCRIPTION	GROSS PROJECT COST	FEDERAL FUNDING	PROVINCIAL ELIGIBILITY FOR STORM SEWER CONST'N	PROVINCIAL ELIGIBILITY FOR STORM SEWER CONST'N (1)	AMOUNT (1)	D.M.I.P. PROGRAMME FUNDING	NEIRD ROADS FUNDING	M.T.C. SHARE	M.S.E. SHARE	NEIRD WORKS SUBSIDY	TORONTO SHARE
Roston Rd, Harrison St, and Ossington Ave	2,000,000		15	292,000							
TOTALS	2,000,000	0		292,000	0	0	0	0	292,000	20	341,400 1,366,600
					292,000				292,000		341,400 1,366,600

Total identified projects - amounts allocated	13,405,000	0		4,816,900	300,000	0	1,761,300	2,855,400		3,981,650	5,006,450
Contingency	488,800		50	344,400				344,400	50	172,200	172,200
GRAND TOTAL	14,293,800	0		4,961,300	300,000	0	1,761,300	2,900,000		5,153,850	5,178,650

SCHEDULE 3
1983 SHORT TERM PROGRAMME FOR WATERFRONT WATER QUALITY IMPROVEMENT
Accelerated Sewer Separation Projects

BOROUGH OF EAST YORK PROJECT DESCRIPTION	GROSS PROJECT COST	FEDERAL FUNDING	PROVINCIAL ELIGIBILITY FOR STORM SEWER CONST'M (12)	PROVINCIAL ELIGIBILITY FOR STORM SEWER CONST'M (AMOUNT)	O.M.T.P. PROGRAMME FUNDING	METRO ROADS FUNDING	M.T.C. SHARE	M.O.E. SHARE	METRO ROADS SUBSIDY		EAST YORK SHARE
									(12)	(AMOUNT)	
Pope Ave Trunk Stage 2	780,000		24	185,000			185,000		50	297,500	297,500
Linnears/Hortimer Stage 2B3	405,000		50	300,000	300,000				50	152,500	152,500
Willey/Bunsere/Lesmount Stage 2	485,000		34	235,000			235,000		50	235,000	225,000
Carlton/Logan/Bilmerth etc Lucella	140,000		50	80,000			80,000		50	40,000	40,000
Leaside Stage 2, Phase 2 (1984)	1,550,000		29	450,000			450,000		50	550,000	550,000
Leaside Stage 2, Phase 1	1,595,000		30	390,000			25,000	365,000	50	402,500	402,500
Cashburn/Virginia	875,000		70	570,000				570,000	50	152,500	152,500
Cedarvale/Silverton	720,000		70	445,000				445,000	50	127,500	127,500
TOTALS	6,970,000	0		2,475,000	300,000	0	975,000	1,400,000		2,147,500	2,147,500

As per information provided on May 15, 1983

APPENDIX 'F'



Ontario

news release

April 29, 1985

Ministry
of the
Environment

FOR FURTHER INFORMATION
J. Steele (416) 965-7117

ENVIRONMENT ONTARIO TO SPEND \$9.7 MILLION ON METRO BEACHES

The Ministry of the Environment will spend \$9.7 million this year to improve Metro Toronto's beaches, Environment Minister Morley Kells announced today.

The Ministry will give Metro Toronto \$0.8 million for the clean-up of debris from both the eastern and western beaches, for a model designed to predict beach closures in advance, a plan to eliminate stagnant water from behind breakwaters and a pilot project to test the feasibility of the disinfection of sewer outfall discharges.

Metro Toronto had originally asked the province for only \$0.4 million for this part of the clean-up.

In an effort to accelerate clean-up operation, the Ministry has significantly increased its contribution from last year. Besides the \$0.8 million for direct beach clean-up, the Ministry will also give Metro \$2.9 million for sewer separations and a \$5.6 million grant for improvements made to the Humber, Highland Creek, and Main sewage treatment plants. In addition to these funds, the Ministry is also spending an additional \$0.4 million on other studies and research into beach pollution.

The \$9.7 million provincial funding combined with Metro Toronto's and other agencies' contributions, will generate over \$40 million in expenditures on direct beach and beach related programs and further strengthens the program from last year.

"I am committed to continue this clean-up program so that Metro's beaches can be enjoyed by everyone," Mr. Kells said. "Toronto's beaches are important both to its citizens and to the many tourists that visit the city every year."



As a result of last year's program, 11 out of 20 Metro Toronto beaches were able to remain open to the public for bathing for all or most of the year.

As part of the \$9.7 million program, \$5.6 million in grants will be given to Metro for improvements this year on treatment facilities, odor control, gas piping replacements and aeration at the Humber, Highland Creek and Main sewage treatment plants.

The Ministry will also contribute \$2.9 million in grants to Metro's sewer separation program. Combined storm and sanitary sewers are suspected of being one of the causes of high bacteria counts in waters off Metro beaches. During heavy storms these old sewer systems discharge both stormwater and sanitary sewage to the lake as well as flooding basements in some homes.

More than \$200,000 will be spent this year by the Ministry of the Environment on the Toronto Watershed Management Strategy Study (TAWMS). The study is designed to define and develop effective solutions to water quality impairment in Toronto area watersheds. It places special emphasis on pollution abatement measures for the Don and Humber rivers and Mimico Creek, waterways which influence the water quality of Toronto Beaches.

Another \$200,000 will be spent on research into the impact of water fowl on Metro Toronto's western beaches and a detailed Humber River/Black Creek bacteriological water quality study.



Tony O'Donohue, P.Eng.

Executive Alderman

Ward 4

City Hall, Toronto M5H 2N2

Tel: 947-7012



August 21, 1985

The Honourable Thomas McMillan
Minister of the Environment
House of Commons
Ottawa, Ontario
K1A 0A6

Dear Mr. Minister:

Congratulations on your appointment to what many of us in Canada who treasure its natural resources consider to be one of the most important portfolios in the Government of Canada. As a professional engineer specializing in waste management and pollution control, I was committed to cleaning the environment before I entered politics. Now as chairman of the Metropolitan Toronto Water Pollution Committee I am able to commit my energies into improving the quality of the recreational waters of Lake Ontario and the rivers that flow into it.

Our Committee was formed in the fall of 1983 as a result of an increase in the number of beaches that were closed during the summer of 1983 because of high bacteriological readings. There are many factors: antiquated sewer systems that overflow during high rains, discharging human waste into the lake; animal and wildfowl droppings, roof and garden runoff all flowing into the storm sewers, and pouring untreated into the Lake, etc.

We have many of the answers, but lack the capital to effect remedies 'the patient is sick, and we can't afford the prescription'. The Metropolitan Council increased the grant allocation to allow two municipalities in Metro to step up their program of separating their sewer system. The Government of Ontario produced monies for many items we felt on a short-term basis was needed, while the previous Federal Government provided \$3.5 million to assist the City of York and the Borough of East York in the programs.

Through correspondence with your predecessor, we understand that monies are not available this year to assist Metropolitan Toronto in its water pollution program, yet I would like the opportunity to meet with you to discuss the long range program of Metropolitan Toronto in combating water pollution in this area.

Sincerely,

Tony O'Donohue, P.Eng.

Chairman - Metro Toronto Water Pollution Committee

PRESS RELEASE

MAYOR'S OFFICE
BOROUGH OF EAST YORK

August 26, 1985

\$4,000,000.00 STORM SEWER SEPARATION PROJECT
WILL COMBAT LAKE POLLUTION

Mayor David Johnson announced to-day the beginning of the last major East York storm sewer separation project to combat the polluted beach waters of Metropolitan Toronto.

The official ground breaking ceremonies for the south Leaside storm sewer separation project will commence at 10:00 a.m. on Thursday August 29th at the intersection of Millwood Road and Southvale Drive (Leaside Memorial Gardens).

"Once this \$4,000,000.00 project is complete all East York storm trunk sewers will be constructed" said the Mayor.

The Mayor continued, "It will then be necessary to construct the smaller and less expensive local storm sewers that connect into the trunk sewers to separate all rain water from sanitary sewage."

The Mayor indicated that this project will be a combined effort by the Borough of East York, the Ministry of the Environment, the Ministry of Transportation and Communications and Metropolitan Toronto. With this continued co-operation the residents of Metropolitan Toronto can look forward to cleaner beach waters.

For release on August 29, 1985.

For further details contact:-

Gary J. Craig, P. Eng.,
Project Engineer
Borough of East York
Engineering Department
461-9451

2

PROJECT DESCRIPTION

TITLE: SOUTH LEASIDE STORM SEWER SEPARATION PROJECT

GROSS COST: \$3,250,000.00

DESCRIPTION:

This project involves the construction in tunnel of approximately 1,500 metres of concrete storm sewer. The pipe size varies from 2,100 mm (84 inch) at the downstream end to 1,500 mm (60 inch) at the upstream end. The location of the construction is as shown on the attached sketch.

When this project is completed in 1986 it will enable work to start, in a staged programme, to separate the storm water from sanitary flow in approximately 170 hectares of the Leaside area of the Borough.

CONSTRUCTION SCHEDULE: Work will start in September 1985 and is expected to be complete by late 1986.

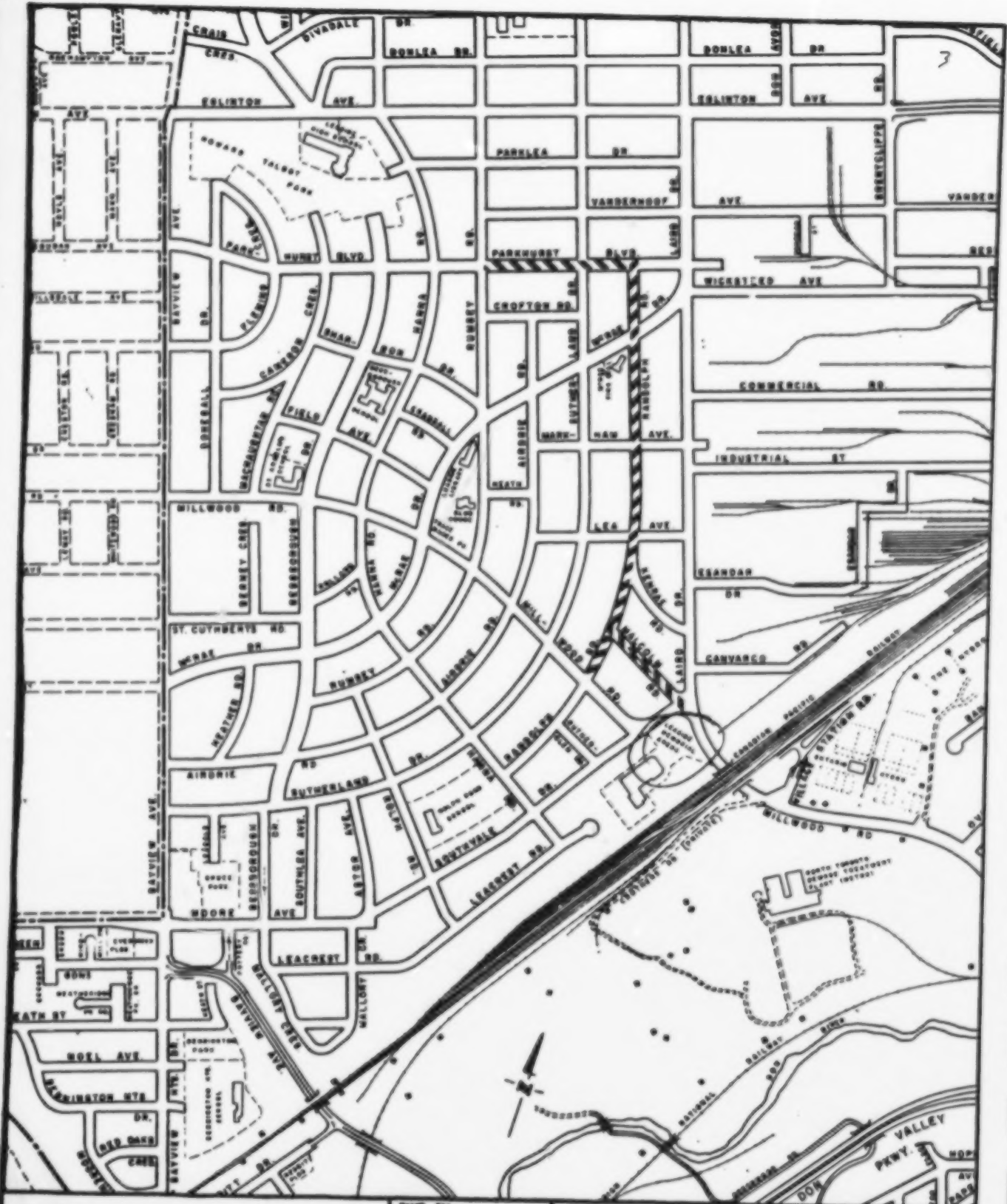
CONSULTANT: Gore & Storrie Limited
Consulting Engineers

CONTRACTOR: S. McNally & Sons Limited,
Engineers and Contractors

FUNDING: This project is jointly funded by the Borough of East York, Metropolitan Toronto, the Ontario Ministry of the Environment and the Ontario Ministry of Transportation & Communications

WORKS DEPARTMENT
BOROUGH OF EAST YORK

5



BOROUGH OF EAST YORK
ENGINEERING DEPARTMENT

COMMISSIONER OF WORKS
 PAUL G. COCKBURN, P.ENG.

DWG. BY
 SCALE
 PLS.

SOUTH LEASIDE
STORM SEWER
SEPARATION PROJECT



City of Toronto

Tony O'Donohue, P.Eng.

Executive Alderman

Ward 4

City Hall, Toronto M5H 2N2

Tel: 947-7012



May 13, 1985

The Honourable Michael Wilson
Minister of Finance
House of Commons
Ottawa, Ontario
K1A 0A6

Dear Mr. Minister:

Re: Waterfront Water Quality
Improvement Programme

Thank you for meeting with R.G. Ferguson, Deputy Commissioner of Works, Bryn Lloyd, Co-ordinator Water Pollution Committee and myself on April 27, 1985.

As I indicated, Metropolitan Council on April 2, 1985, in adopting the report (copy attached), concerning funding for Lake Ontario waterfront water quality improvements and other public works projects, requested that I arrange for the Water Pollution Committee to meet with METPAC, the committee of Metro area Progressive Conservative M.P.s., to discuss Federal funding. Unfortunately this meeting did not materialize.

The attached is a brief review of recent history and present status of Federal and Provincial involvement in public works grants.

It also invites that the Federal government re-initiate their programme possibly on a basis similar to the programme which was discontinued in 1979.

We urge you to review the current Federal non-participation and to re-establish some form of assistance.

We would also like to bring to your attention the fact that in 1984, a two-year acceleration of our sewer separation programme was undertaken. The Metropolitan Toronto contribution to the projects initiated by our local municipalities has been doubled from 25% to 50%, for a total of \$7,446,500.00 in 1984. The Provincial government of Ontario contributed an additional \$2,000,000.00 in 1984, and the Federal government provided \$3,500,000.00 under an Employment Stimulation Programme.

.....2 .

We have been asking that the Provincial involvement should continue with assurance that funding allocation annually will be adequate to meet amount of municipal eligibility under existing programme criteria.

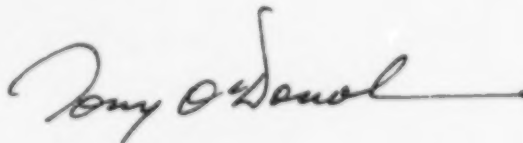
We also urge you to continue the Federal participation in the second year of this accelerated effort.

It should be noted that the Federal contribution when received by the local municipalities initiating the projects generates additional Provincial and Metropolitan contributions at up to 50 per cent respectively.

Therefore, a further \$2,500,000.00 Federal contribution for the second year of the programme could generate \$10,000,000.00 in projects with resulted job creation and waterfront water quality improvements.

We again urge you to participate in the 1985 acceleration programme and to consider a basis for re-initiation of Federal involvement in public works on an ongoing basis.

Sincerely,



Tony O'Donohue, P.Eng.
Chairman - Metropolitan Toronto
Water Pollution Committee

Encl.

2

BRIEF
BY WATER POLLUTION COMMITTEE
ON
HISTORY AND STATUS OF CONTRIBUTION BY
FEDERAL AND PROVINCIAL GOVERNMENTS FOR PUBLIC WORKS

Since 1954, Metropolitan Toronto has spent \$894,580,232 on Capital Works, an average of \$28,857,426 per year. Of this amount of \$448,636,522 or \$14,472,145 per year has been spent on Water Pollution Control or basically sewage treatment plants and including sewers and sewer separation projects.

Commencing in 1962, our Capital Works Programme was assisted by contributions from the Federal government to the extent of 16-2/3 per cent grants. In addition, the total amounts of borrowing required were also provided by the Federal government, Central Housing and Mortgage Corporation loans at favourable interest rates.

The discontinuance of Federal grants in 1982 significantly delayed achievement of water pollution control objectives in Metropolitan Toronto.

Provincial contributions commencing in 1974 have been available to the extent of 15 per cent, and last year we received approximately \$3,673,011 of our \$43,791,293 Capital Works Programme costs from the Provincial government.

In addition to direct grants in the past, we have cooperated with the Federal programmes for employment stimulation from time to time when available, and while achieving employment objectives, the financial contributions have also been effective in our Capital Works Programme.

Our Capital Expenditures on pollution control can be placed in five Objective Categories:

- (1) Effluent quality improvement
 - BOD and SS removal
 - Phosphorus removal
- (2) Solids
- (3) Odour Control
- (4) Energy and Cost Efficiency
- (5) Sewer Separation

The first category and particularly phosphorus removal is related to Federal and International Joint Commission initiatives and objectives. The guidelines of 1.0 ppm from phosphorus are now being met.

The latter category has received approximately 5 to 6 per cent of our capital budget, \$2 million per year, since our programme of Metropolitan Sewer Separation Subsidy at the rate of 25 per cent of gross cost was instituted in 1974. In 1984, due to efforts by Metropolitan and the local municipalities to accelerate work and improve waterfront water quality, 10 per cent of our Capital Budget was devoted to sewer separation subsidy.

New stringent Health Department water testing on Lake Ontario beaches lead to swimming restrictions in 1983 and 1984 which necessitated this subsidy to be increased to 50% for a two-year period to accelerate action to improve waterfront water quality.

The Provincial Ministry of the Environment has also responded by providing make-up funding equivalent to shortfall in Ministry of Transportation and Communications (MTC) for eligible projects, essentially new storm sewers to take storm water from existing combined sewers, and leaving them exclusively dedicated to conveyance of sewage to treatment plants. The rate of MTC eligibility is up to 50 per cent of gross cost and dependent on design criteria, however, in recent years there has been an increasing shortfall between eligibility and allocation for payments to the municipality.

Minister of Finance



Ministre des Finances

28 1985

Mr. Tony O'Donohue, P.Eng.
Chairman
Metropolitan Toronto Water
Pollution Committee
City Hall
Toronto, Ontario
M5E 1N2

Dear Mr. O'Donohue

Thank you for your letter of May 13 following our meeting of April 27, 1985 and for the accompanying documents on public works projects and waterfront water quality improvements which you have kindly made available. I was also pleased to have met Metro officials, Mr. R. G. Ferguson, Deputy Commissioner of Works and Mr. Eryn Lloyd, Co-ordinator Water Pollution Committee who were present at our meeting.

I have noted the points raised and your request for continued federal participation in the sewer separation program. You would be aware that the federal government committed \$65 million to the construction of sewage facilities in Ontario beginning in April 1982 under the terms of the Canada/Ontario Agreement respecting Great Lakes Water Quality. As you have noted, the federal government contributed an additional \$3.5 million last year under special projects. While these latter programs are not being extended, we will fulfil our commitment to complete the original agreement (requiring the expenditure of \$10 million over 1985/86 and 1986/87).

.../2

I will be passing a copy of our correspondence to my colleague, the Honourable Suzanne Blais-Grenier, Minister of Environment for her information. I wish to express my appreciation for the interest and time you have taken to bring these issues to my attention.

Yours sincerely,

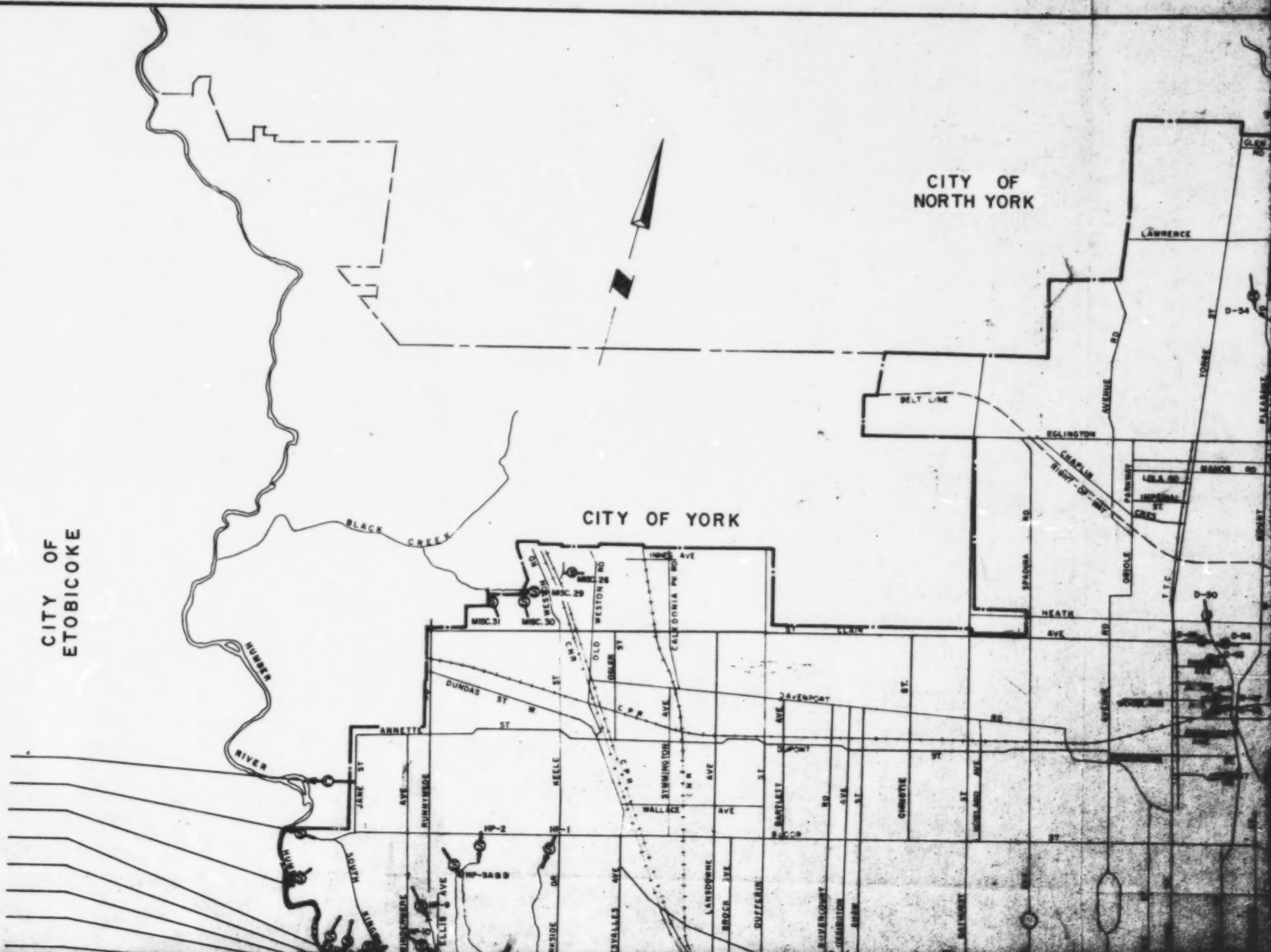


Michael H. Wilson

c.c. The Honourable Suzanne Blais-Grenier

H-13
H-12
H-10
H-9
H-8
H-7
H-6B
H-2A

CITY OF
ETOBICOKE



CITY OF
NORTH YORK

CITY OF YORK

FIG. N° 1

MAP SHOWING STORM OUTLETS
AND COMBINED SEWER OVERFLOWS
INTO LAKE ONTARIO AND OPEN WATER COURSES

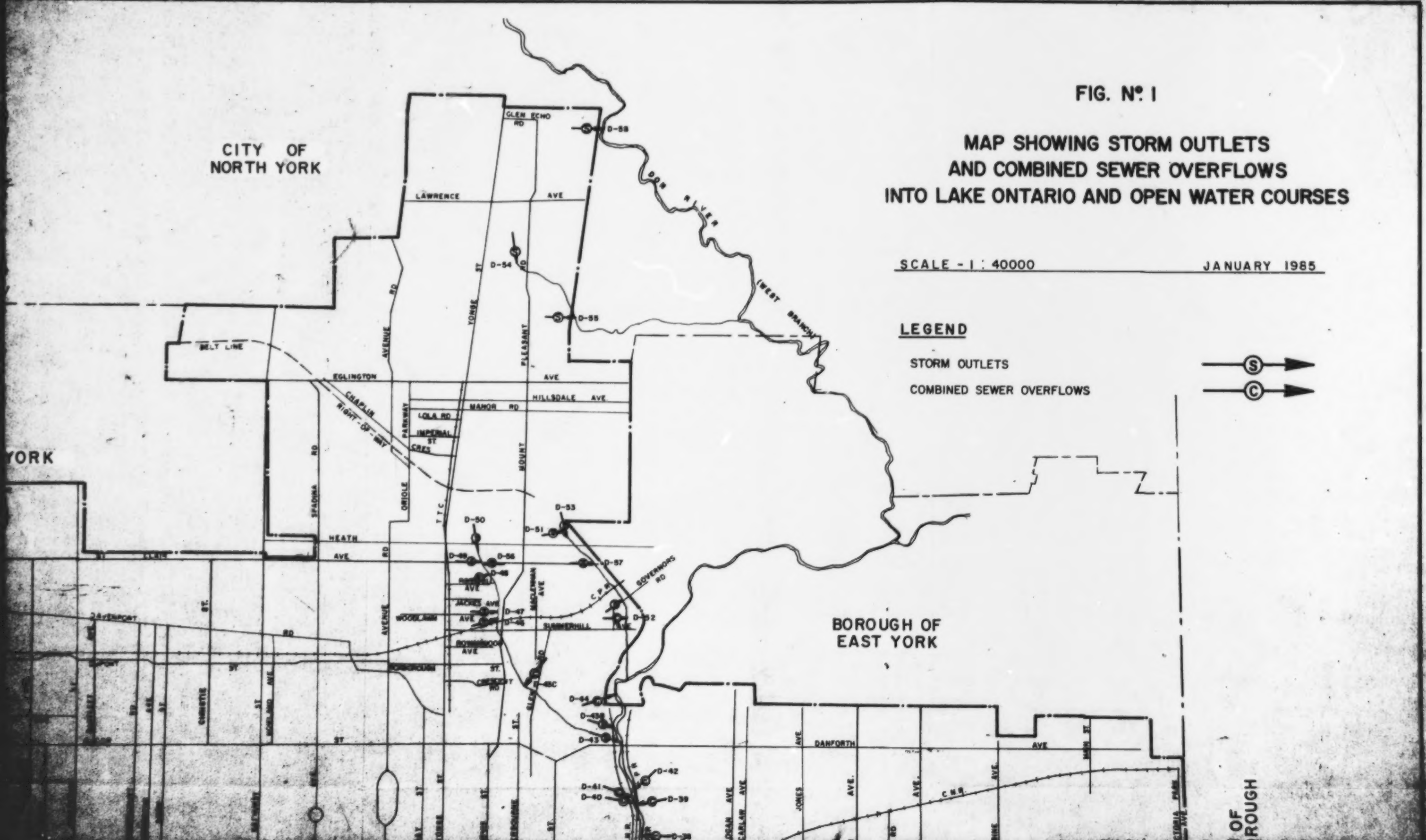
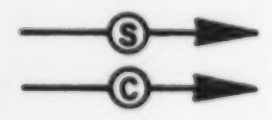
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JANUARY 1985

LEGEND

STORM OUTLETS

COMBINED SEWER OVERFLOWS



OF
ROUGH

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H-12
H-10
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H-5
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H-3
H-2

H-1
W-12
W-11
W-10
W-13
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W-5
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W-3
W-2
W-1

